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COMPUTERWORLD

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IBM adds functionality to its System/38 Mapics II offering, claiming to place it on par with the System/36 version. Page 19.

MIS winds to redirect Lotus TAC

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. is readying a major rerelease of The Application Connection, a personal computer-to-mainframe data extraction product that will shield users from mainframe syntax, allow machines other than PCs to extract mainframe data and provide a link to IBM's DB2.

The release, scheduled to ship mid-year, was designed from the feedback from large corporations that demanded an easier way for PCs to access host data. Users also insisted that TAC work with a broader range of applications and architectures.

TAC, which allows PC users

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Industry awaits copy-proof PCs

With new bus, 3½-in. format, IBM to attempt freeze out of clone makers

BY PATRICIA KEEFE
CW STAFF

AUSTIN, Texas — IBM is expected to announce in early April the first in a series of new microcomputers, signaling both its commitment to a 3½-in. disk format and movement toward a closed architecture.

According to informed sources, the IBM machines will include a high-end addition to its Intel Corp. 80286-based Personal Computer AT family along with a low-end Intel 8086-based computer targeted at the home and education markets.

In addition, sources said Microsoft Corp. will unveil DOS 3.3, an incremental upgrade said to improve the programming environment and to correct bugs in DOS 3.2, including problems not addressed by the patch-disk upgrade released in November 1986.

The new computers will reportedly incorporate proprietary features — including graphics and a nonstandard bus structure — designed to throw the clone makers off IBM's back and to rebuild its shrinking microcomputer market share. For example, the nonstandard bus means users cannot migrate their existing PC AT add-on boards. Sources speculated that IBM may unveil some add-in cards next month.

Wait and wonder
Big business stalls purchases, compelled to wait for IBM direction. Page 4.

"The word in [Silicon] Valley is that it will take $2 million and 18 months before the machines can be copied," said Michael Murphy, publisher of the newsletter, "California Technology Stock Letter," and a partner in a small software company.

Despite the proprietary changes, most existing software, including that written to take advantage of IBM's Enhanced Graphics Adapter standard, will run on the new machines, the sources said.

However, software that is written to take advantage of the capabilities of the new computers will not run on their older siblings. This software is not expected to be available for several months.

IBM will reportedly take advantage of surface-mount technology and robotics to cut manufacturing costs, significantly downsize the new computers and help bolster efforts to keep clone makers at bay. Surface-mount technology is said to be much harder to reverse-engineer or copy.

According to the sources, the new products include the following features:

- 80286 desktop — 10-MHz clock speed, 3½-in. floppy disk drive with 1.5M bytes of storage, 256K bytes of random-access memory, three horizontal expansion slots, IBM pro-

Continued on page 5

SOFTWARE SLUGFEST

DBMS contenders in grudge match

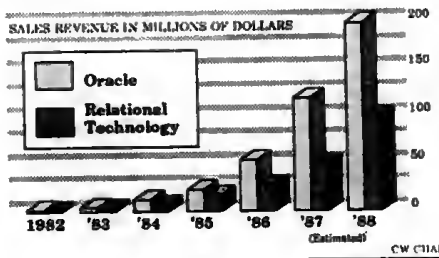
BY CHARLES BABCOCK
CW STAFF

ALAMEDA, Calif. — Oracle Corp. and Relational Technology, Inc. have a lot in common: They are both young companies making their fortunes in relational data base technology; they are both pioneers in the field of distributed data bases; and they both find it hard to resist taking jabs at each other.

"Relational Technology," says Peter Tierney, vice-president of marketing at Oracle, "is obsessed with competing with Oracle."

Tierney ought to know. Until two months ago, he was vice-president of marketing at Relational Technology. He left in the midst of a reorganization and was replaced by P. Michael Seashols, who had been hired by Relational Technology from Oracle a year ago.

Improving relations
Oracle and Relational Technology compete fiercely in rapid growth market



CW CHART

"When you start getting in each other's soup that way, the seeds of competition are pretty well sown," observes Kenneth J. Burke, vice-president of Alex Brown and Sons, Inc., a Baltimore brokerage house.

The two companies, situated on opposite sides of the San Francisco Bay, are marketing what many observers regard as similar relational data base management systems. Their announcements tend to come quickly upon the heels of one another, and their strategic directions sound much the same. But when company officials talk about the competition, they paint each other as poles apart.

Both companies have moved rapidly into distributed data base technology, not because there are many customers but because

Continued on page 121

Tandem SQL called top performer

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — In a move that former IBM fellow E. F. Codd hails as a major data base advance, Tandem Computers, Inc. today is expected to announce implementation of SQL on its Nonstop transaction processing systems.

With this announcement of its Nonstop SQL, Tandem marries the most widely recognized element of relational data bases to an existing architecture that permits the company's systems to expand modularly.

The result is that Tandem's 10-year-old Encompass data base management systems now reportedly combine relational-like ease of use with perfor-

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NEWSPAPER

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Fonts, picas and H&J. Desktop publishing strategies include IBM's using 9370 as the hub and PCs as separate publishing workstations, Interleaf porting its software to IBM and DEC environments to provide an integrated, corporatewide electronic system and Bettex offering its graphics workstation to systems builders in manufacturing, military and education. **Pages 12, 13, 51.**

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"The word in [Silicon] Valley is that it will take $2 million and 18 months before the [new IBM PCs] can be copied."

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Users berate plan to deregulate Bells

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Business communications managers oppose the Department of Justice's proposal to allow the regional Bell holding companies to offer certain long-distance services, a spokesman for the International Communications Association (ICA) said last week.

The battle about the Justice Department's proposed changes in the AT&T divestiture decree heated up last week as interest groups filed their first round of comments to U.S. District Court Judge Harold H. Greene.

Although the department's proposed change in AT&T divestiture rules would give users seven new vendors to consider, the managers are concerned that the telephone companies would compete unfairly and drive firms such as MCI Communications Corp. and U.S. Sprint Communications Co. out of business, said Brian R. Moir, the ICA's counsel.

Bell monopoly strong

At a press conference, Moir and other critics said the Bell companies still have monopoly power over the local networks and thus could discriminate against companies that need access to the local loops.

The Justice Department recently urged Greene to change the decree to allow the holding companies to enter the equipment manufacturing and information service businesses and offer long-distance services outside their regions [CW, Feb. 9].

There were few surprises in the comments. Existing vendors in each of the three markets vigorously opposed entry by the Bell companies for fear of monopolistic actions, while the seven holding companies argued that they should be released from outdated regulatory restraints on competition.

Fearing competition

Long-distance firms that cropped up after AT&T's divestiture said they felt threatened by the Justice Department's proposal, but the holding companies have charged that they simply fear competition.

"By definition, competition cannot flourish against a natural monopoly," responded a spokesman for Allnet Communication Services, Inc., a Birmingham, Mich.-based long-distance company. "We're not afraid of competing with the Bell companies, but they have advantages that no one else can have," he said.

Nynex Corp. Chairman Bud Staley reported that the New York-based holding company supports speedy implementation of the Justice Department recommendations. However, Staley added that Nynex is disappointed it will not be allowed to offer interexchange service within its region.

Analysts said the Bell companies had wanted permission to resell the services of AT&T, MCI and U.S. Sprint within their territories as well as to provide large business customers in their regions with customized, private interexchange networks.

Spokesmen from Bell Atlantic Network Services, Inc. in Arlington, Va., said Bell Atlantic wants to go beyond the services suggested by the Justice Department and offer a variety of interexchange services inside its region, including private and packet networks and 800-number and WATS services.

Data communications equipment vendors strongly opposed lifting the manufacturing prohibition, arguing that the Bell companies would enter into joint ventures with certain manufacturers and buy only from those vendors, which would be detrimental to other suppliers.

The opposition

The Computer and Business Equipment Manufacturers Association, the Independent Data Communications Manufacturers Association (IDCMA), the Electronics Industry Association and the North American Telecommunications Association all opposed the Justice Department.

Herbert E. Marks, counsel to IDCMA, said that each of the holding companies could easily capture a $6 billion market for equipment attached to its own local loops, such as Integrated Services Digital Network (ISDN) equipment.

George R. Dellinger, telecommunications analyst for Washington Analysis Corp., predicted that Greene is likely to accept the recommendation on manufacturing but reject the one on long-distance service.

"Separating the local monopoly from the potentially competitive long-distance market lies at the heart of the consent decree, and Judge Greene may find that little has changed in the past three years to warrant diluting the prohibition in any fashion," Dellinger said.

Even if the court permits the Bell companies to enter the long-distance market, the decision is likely to be appealed by AT&T to the U.S. Supreme Court, a process that could take two years, Dellinger added.

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Waiting at the altar for IBM

Corporations freeze PC purchasing, wait for Big Blue to speak

BY DAVID BRIGHT
CW STAFF

Although it is uncertain exactly what Personal Computer systems IBM may introduce next month, many managers at large corporations have been holding off on micro purchases until they find out.

Since IBM has been steadily losing market share in the PC arena, it is preparing some radical moves to thwart some of the clones and to bring MIS managers back under its thumb, observers said. The offerings could include a low-end PC based on the Intel Corp. 8086 microprocessor, a line of PC ATs based on a 10-MHz Intel 80286 and systems built around the 32-bit 80386. Although there is a good chance that the systems will be based on a new architecture, many managers surveyed by *Computerworld* indicated that they will seriously consider the new IBM architecture unless the machines turn out to be a total disaster.

"[IBM] is extremely important and will be more important in terms of our overall architecture," stated John Langenbahn, vice-president of information resources at Mead Corp. in Dayton, Ohio. In anticipation of the announcements, Mead has been delaying PC purchases, he said.

Northrop Corp.'s Northrop Defense Systems Division in Rolling Meadows, Ill., will stick with IBM "unless they mess up my compatibility too badly," said Ed Macke, manager of personal computer systems. While waiting for more powerful systems from IBM, the division has been buying a few Compaq Computer Corp. Deskpro 386 systems, but only as a stopgap measure, he noted. Macke said he is fearful about what might happen if IBM's new machines turn out to be incompatible with software and add-on boards. He added that he already has enough trouble matching boards between IBM's newer and older PCs.

Eaton Corp., based in Cleveland, has also been adding a few Deskpro 386s but is not planning on abandoning IBM, according to Fred Zickert, manager of the firm'a PC support center. "We're going to give IBM a serious look no matter when or what they come up with," he said. Zickert noted that it is a necessity for IBM to drop the price of the AT while speeding it up. Currently, users who do not need a Compaq Deskpro 386 often buy one anyhow because the price is not much more than that of a fully configured AT, he said.

> "WE HAVE no interest in a machine, no matter how fully functioned it is, if it is also incompatible with existing software."
>
> WALT KENNAMER
> ERNST & WHINNEY

In addition to hardware and software compatibility with existing systems and competitive price/performance, managers said they are looking for a more powerful operating system as well as built-in communications functions such as token-ring and LU6.2. Including communications functions would help in the integration of PCs with mainframes and help return control to the MIS manager.

"The problem that most corporations have with PCs right now is getting data from the mainframe and sharing data around the corporation," Mead's Langenbahn noted. "IBM's strength is on the mainframe side. They're going to play up on communications between the mainframe and the PC."

But some managers are skeptical about a change to new architectures and a new performance level. Walt Kennamer, senior manager of the National Computer Audit Group at Ernst & Whinney, the Cleveland accounting firm, said talk of higher performance IBM PCs does not concern him. "The issue is how to train users," he said. "The question is how to make the PC and applications easier to use and learn. We have oo interest in a machine, no matter how fully functioned it is, if it is also incompatible with existing software. If we have to retrain our users, it's not what we need."

Kennamer, who is responsible for his firm'a 5,000 PCs, said evaluating new micros has become a purely economic decision. While hardware costs are significant and software fees are high, he said, user training is the firm's highest PC-related expense. "You're talking about training costs that are two to three times higher than the cost of hardware and software costs together," he explained.

"Companies have a very large investment in the existing inventory base and have finally become comfortable with the standards that exist right now," agreed Cberyl Currid, manager of sales, systems, planning and informatioo at Coca-Cola Co. Foods Division in Houston. If IBM brings out a superior product that gives the user base a migration path, then people may move quickly to that new standard. Otherwise, IBM may find itself losing even more control in large corporations, she noted.

But according to one microcomputer evaluation manager who has seen some of the new machines, users who are expecting a smooth transition from the old architecture to the new will be in for quite a shock. The evaluatioo manager said the AT line expected on April 2 represents a radical departure from the current ATs. IBM does not plan on introducing its 80386 machine at this time, he said.

Built around a 10-MHz 80286 and a new bus with no more than four slots, the systems employ surface-mount technology and 3½-in. floppy disk drives to achieve a small 15- by 15-in. footprint, the manager said. He added that he does not expect IBM to offer a 5¼-in. drive option. He noted that a troubling aspect of the systems is their inclusion of a 1.5M-byte floppy disk drive instead of the 720K-byte unit contained in the IBM PC Convertible.

Many observers said they expect a slightly enhanced version of IBM'a PC-DOS, but the source claimed that software compatibility may be limited.

While the new bus will oot he closed, boards built for the current AT bus will not be usable with the new system in any way, according to the source. IBM considers the bus to be an improvement of the "primitive" AT bus rather than a way of throwing the clones off course.

Improvements reportedly include the self-identification of boarda and a decrease in radiation. The system board is expected to contain nonstandard graphics capabilities, which the manager described as an expansion of IBM's Enhanced Graphics Adapter. The system board will oot include built-in commuoications, be claimed.

The new machines are visually attractive and will be priced lower than current AT systems, the source said. AT prices currently begin at $3,395 for a system with 256K bytes of memory and one floppy disk drive.

Senior Editor Patricia Keefe and Correspondent Alan Alper contributed to this report.

Altered systems, data blindside Volkswagen in record-breaking $259M computer fraud

BY CLINTON WILDER
CW STAFF

WOLFSBURG, West Germany — Volkswagen AG last week said it discovered that a corporate foreign exchange loss of as much as $259 million had been fraudulently covered up through the alteration of computer programs and erasure of data tapes.

The case appears to be the biggest reported example of computer fraud in history.

The fraud was apparently perpetrated by a currency trader or traders, either within Volkswagen or with an outside financial firm, who handled Volkswagen corporate funds in 1984.

Volkswagen will include a provision for the estimated amount of the loss in its 1986 financial results.

'Covering up bad moves'

In a radio interview in West Germany, Volkswagen board member Karl Gustaf Ratjen said that the fraud involved computer programs and storage tapes, according to published reports.

"I would speculate that someone made some bad moves in currency trading and, to cover it up and impress the boss, fabricated the computer records so the reports continued to look good," according to Jack Bologna, who is a noted computer crime consultant and professor of management at Siena Heights College in Adrian, Mich.

The person or persons involved would probably have had to rewrite processing software as well as alter output, Bologna said. "In a company of Volkswagen's size, they would have needed sophisticated skills in applications programming and mayhe systems programming as well," he said.

Volkswagen said it filed fraud, breach of trust and forgery charges against individuals outside the company but did not rule out the involvement of its own employees.

The case has elements reminiscent of the previous largest computer fraud case. In 1972, investigators discovered that Equity Funding, a Los Angeles insurance firm, hid corporate losses from its auditors by generating $200 million worth of fake insurance policy sales through its data processing department.

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Industry awaits

CONTINUED FROM PAGE 1

prietary graphics on the motherboard (16 colors and 640- by 480-pixel resolution) and 40M- and 70M-byte hard drives. A user who has seen the system said a base unit is expected to cost $3,335 with one floppy disk drive and 256K bytes of RAM.

- 8086 PC — 3½-in. floppy disk drive, IBM proprietary graphics on the motherboard, built-in video. Performance is said to be close to that of the original PC AT, with pricing expected to fall between $1,000 and $1,500.
- DOS 3.3 — Contains new drivers that are less forgiving than previous versions of DOS in the area of interrupt-processing; will partition bigger drives but still have the 32M-byte limit per drive.

Many IBM observers said they expect IBM to restructure its PC line in the wake of the April announcements. Most sources said IBM will probably eliminate configurations of some models. Although there are significant differences between IBM's current ATs and the future AT, some observers questioned whether the newer model would cannibalize the older machines.

One user said IBM told him the current AT, released 2½ years ago, would be phased out, while another user said the AT model is becoming harder to get.

Many IBM watchers speculate that IBM will incorporate LU6.2 into read-only memory and an IBM Token-Ring chip onto the motherboard. One consultant said he saw a Token-Ring chip in a 386 prototype.

IBM execs offered hints

Speaking at a recent seminar on desktop communications, Robert Carberry, IBM'a director of engineering and technology, told attendees that the current crop of PCs does not accommodate communications. He said IBM would alter the internal architecture of its next-generation PCs to better support connectivity. His comments have been echoed publicly by at least two other IBM executives during the last two months.

The industry is also rife with reports of an IBM 80386-based computer. Several sources said they have seen several versions of IBM's 80386-based computer but added that the machine was not stable enough for release.

IBM is smarting over sales lost to Houston-based Compaq Computer Corp.'s Deskpro 386, which began shipping in volume in October 1986, according to analysts.

Joe Cross, an analyst with Future Computing, Inc. in Richardson, Texas, estimated that the high-ticket Deskpro 386 is generating between $3.5 million and $4 million a month in revenue. During a six-month period, the Deskpro 386 has pulled down between $21 million and $24 million in end-user sales, he added.

"That's some indication of the money that IBM is leaving on the table — and that ain't hay," he said.

Wang refutes report that 27 execs left

BY ALAN J. RYAN
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. officials last week said a *Computerworld* story reporting that 27 of its vice-presidents had left the company since January was untrue.

"Twenty-seven vice-presidents is like half our vice-presidents," said Bob Doretti, senior vice-president of communications. He said the correct number of departed vice-presidents is seven.

Spokesman Paul Henning said Wang had 66 vice-presidents as of Jan. 1 and currently has 58. The most recent to leave was Ernie Cornelssen, vice-president of U.S. customer-service organizations. Cornelssen resigned on March 6.

Henning said that none of the vice-presidents, other than those who had left Wang, "have been shifted to anything else. They are still vice-presidents."

Henning said he did not know if some of the eight vice-presidents had been asked to leave the company. "I would assume some of them were involved . . . in the plans and the consolidation effort we announced in January," he said.

Pay cuts to trim budget

Wang said in January that it would attempt to trim $50 million from its budget by June 30 of this year through a 6% pay decrease for all U.S. salaried employees and through a 1,000-man reduction in the company's work force.

Doretti also denied internal rumors circulating last week that Wang plans to make an additional 2,000 cuts from the payroll and that the company's U.S. salaried employees will be asked to take a further pay cut of 3% to 4%.

"That is totally wrong. No cuts. No salary cuts," he said. He added that Fred Wang, chief executive officer of the company, had denied the rumors also. "There was an employee letter that went out publicly denying it."

With Wang'a rumor mill working overtime, Doretti said, "You must realize that any time any company has any type of restructuring, reorganization of any kind, you're always going to hear rumors on what is next, who is anticipating what."

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DEC users grumble, accept price hikes

BY NINAMARY BUBA MAGINNIS
CW STAFF

Most Digital Equipment Corp. users polled last week were disappointed with the firm's recent price adjustments but accepted with resignation the prospect of paying higher systems costs.

The far-reaching adjustments slashed dollars off system memory and considerably increased the cost of the high-end VAX line [CW, March 9].

"We just bought an 8700, and I feel relieved we bought it before the price went up," noted Bill Sommerfeld, computer resources manager for Camp Dresser & McKee, Inc, a Boston-based consulting engineering firm.

"I guess I don't quite understand why they're raising those prices," Sommerfeld added. "Since we probably will buy more of those systems in the future, I don't have a positive reaction to it." DEC also lowered the price of its mid-range lineup, replacing the 8200 and 8300, respectively, with the higher performance 8250 and 8350 units. "We tipped the price-per-MIPS curve a little bit," said Bob Flynn, DEC manager of U.S. sales operations, referring to the machines' millions of instructions per second performance. "The entry level is more attractive and the higher end a little bit more expensive on the CPU."

Price hikes reflect system's value

Explaining the $66,000 increase in price for a preconfigured 8700 with 32M bytes of memory, RA81 disk, TU81E tape drive, communications controller and paid-up VMS and Decnet software license (see chart at right), Flynn said that the move reflects the increased value of the 5.8-MIPS CPU.

In contrast, an 8M-byte 8250 with the same peripherals and licensing costs $122,000 and offers 20% greater performance than the old $139,000 8200.

Although DEC extended its one-year warranty to include all hardware, the 8000 series VAX already had a full-year protection built in, DEC's Flynn said.

Customers remain pragmatic

Even with the bad news for high-end VAX customers, large users are pragmatic.

"Obviously, I'm unhappy that the machines I am buying are now more expensive. Does that mean if I need another 8700 down the road that I'm not going to buy one? Probably not," said a vice-president in a major East Coast financial firm.

Before the price hike, the firm purchased an 8700 to add to its high-end 8600 and 8700 Vaxcluster, he added, explaining that DEC officials informed him that memory for an older cluster of several VAX-11/785s and some 8650s would now be maintained for free.

Stanley Rose, manager of technical support for Bankers Trust Co. in New York, looks after two 8700s and more than 48 other VAXs.

Replacement based on price

"We took delivery of several large configurations prior to the price change, and we repriced those based upon new prices," Rose said.

"They were very close — some a little more and some a little less. We tend to buy systems with large numbers of disks and memory. Once you've done that, the price difference becomes much less. The net change was not very great."

DEC's Flynn affirmed this. "In the high end, there's a slight increase," he said. "Certainly in after-market purchases of disk and memory, the customer is getting more value than before. So, overall, we think we made it a lot better for the customer."

Service warranty not worth cost

While DEC now packages an on-site, one-year service warranty for low-end hardware, most users said the price increase does not justify the cost.

"There's a trade-off. I don't think I'm getting anything for free," said a computer engineer for a large pulp and paper mill.

At one site, the paper mill has two 8200s clustered and one Microvax and plans to purchase an 8530 next spring.

"We'll have to re-evaluate our process," the engineer observed. "We'll probably stay with DEC. You don't have to like it, but the capital is invested. We're locked into it."

The sharp increase in Microvax VMS licenses — from $6,000 to $13,000 for 9 to 16 users and from $8,000 to $18,000 for unlimited users — has low-end users concerned.

"I find it disagreeable. I don't understand why they're doing it. It will certainly affect our decisions in the future when we consider buying Microvaxes," said Bill Dishman, computer systems support manager for the Decatur, Ga.-based Simons Eastern Co.

DEC user John Herbst, systems support manager for the Fort Lauderdale, Fla.-based *News & Sun Sentinel*, complained that the 8600 line is getting the short shrift.

The 8600 and 8650 are the only Unibus 8000 series machines, with the others employing a bus interconnect backplane, according to DEC.

Two weeks ago, DEC officials purposely left the 8600 and 8650 off the company's product positioning chart, claiming the other machines give better price/performance.

"I'm a little concerned. It appears to me that DEC is forcing me into the BI architecture. I'm not saying the BI architecture isn't good. I can run a mix of Unibus and BI in a cluster," Herbst observed.

"I'm a little confused as to what they want users to do and why they want us to do it. Why are they forcing the BI architecture? I like the 8650. It's just one heck of a machine," he continued.

Universities will not fare well

Where cutting costs count, some university users will not fare well with the price changes, said Ruth Milner, systems manager for the physics department at the University of Toronto.

"What usually happens in a university environment is you don't buy all that stuff from DEC," Milner explained.

"Apart from the TK50, you can get very good products at about half the price. DEC has come down considerably on Microvax memory, but they're still several hundred dollars more expensive than competitors," she said.

Last week, one third-party competitor — Milpitas, Calif.-based System Industries, Inc. — matched DEC's one-year warranty on DEC-compatible disk and tape subsystems in response to DEC's announcement.

Now for the good news

There is good news for DEC users selling high-end VAXs to other parties, said John DeSouza, international product manager for leasing planning services at Framingham, Mass-based International Data Corp. (IDC).

"The systems that were increased in price should continue to command the same percentage of value in the used marketplace," DeSouza explained.

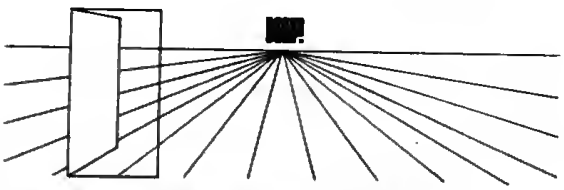
"So, in effect, they're worth more now because of the higher list price. It's great for users who bought them at the old price, mainly because a used market has yet to be established," the IDC product manager said.

DEC price shuffle

Comparative system prices before and after March 4th price restructuring

Preconfigured VAX Systems*	Before	After
8200 8250	$158,000	$141,000
8300 8350	$181,000	$169,000
8500 8530	$330,000	$377,000
8550	$440,000	$512,000
8700	$529,000	$595,000
8800	$721,000	$836,000

* System prices in typical configurations including system software purchase



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12:30 p.m.	Complimentary lunch

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May 12

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May 20

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April 27

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May 15

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April 9

Long Island, NY
April 29

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April 8

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April 21

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April 1

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Nashville, TN
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Net management aids on the way

Codex and U.S. West offerings feature graphics, windows

BY ELISABETH HORWITT
and DONNA RAIMONDI
CW STAFF

Targeting opposite ends of a perceived market for user-friendly network management, Codex Corp. last week released a personal computer-based system, and U.S. West is expected to release a mainframe-oriented system soon.

The products provide functions such as windowing, color graphics, Help screens and mouses — many of which are currently lacking in IBM's Netview family. Still in question, however, is whether these tools will become part of network operators' basic tool kits or get labeled as fancy window dressing.

The Help features provided by Codex's 9300 network management system, unveiled last week, target small to medium-size companies. "Many of these companies don't have the budgets to support skilled network technicians," explained Stephen P. Mank, manager of product marketing at Codex.

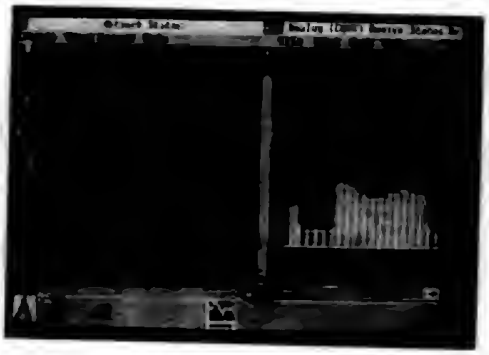
The system's graphics and color-coding presentations provide summary, analysis and filtering of network data for less experienced network managers who cannot extract relevant information from the "spooling screens full of line parameters" that are used by the more technical operators of big companies' complex networks, he added.

Based on an IBM Personal Computer AT or compatible, the initial 9300 systems collect diagnostic information from Codex modems and provide users with ways to view the data with the help of Microsoft Corp.'s Windows, the PC Mouse and color graphics representations.

Depicts data graphically

The U.S. West Graphics Network Monitor, scheduled to be announced in a month, will graphically depict data gathered by the Systems Network Architecture (SNA) network management facilities such as Netview or IBM's Network Communications Control Facility, Network Logical Data Manager and Network Problem Determination Application monitors. If the SNA system does not have these facilities, the monitor exhibits information gathered directly from VTAM, said Stephen Wendfeldt, manager of marketing and business planning for U.S. West Network Systems in Seattle.

U.S. West's product, which will reportedly run partly on the IBM mainframe and partly on an IBM workstation, is targeted at the medium-size or large IBM shop, Wendfeldt added. "This product gives a full-color representation of SNA networks, end-to-end of the network, both software and hardware," he said. The program is expected to be iconographic and intuitive in the sense that it will select relevant data to present. "We use color, alarms, the ability to pan and zoom on any element or combination of elements within the network. The user can move over to an element, point the mouse to it, click on it and have an exploded view of that data," Wendfeldt said.



The Codex system monitors and displays the status of individual network links, including the status of analog and digital lines and modem devices, indicating by color code whether a link is operational, deteriorating or in critical condition. Bar charts present a profile of a line's signal-to-noise ratio, with test segments that fall below the acceptable threshold outlined in red (see diagram above).

The Microsoft Windows program, integrated with the mouse, allows the manager to simultaneously get an overview of network status and focus in on one link, Codex's Mank noted. Help facilities associated with each screen analyze the information provided acting as a training tool for inexperienced managers, he added.

While emphasizing that there is a big market for graphics-based network systems, Frank Dzubeck, president of Washington, D.C., consulting firm Communications Network Architects, Inc., disagreed that such products can take the place of true network expertise. "Artificial intelligence targets lack of expertise in smaller companies because it steps the operator through [the process of analysis]," he said. "If you don't know how, it doesn't matter whether you're given graphics or data."

Puts 'pizazz' in network

Such tools are helpful as the means of presenting network data to "network management one level above network operators," Dzubeck said. "Just like spreadsheets are great for accountants but management needs graphs to get the picture, graphics puts the pizazz into network analysis."

Because it is based on the PC AT, the 9300 has an upward limit of 32 lines, or 400 devices. Companies whose needs expand beyond that limit can plug the 9300 into Codex's higher end 4860 system — but that means losing the 9300's Help facilities, Mank said. Codex plans to test the market for graphics-based network management before committing to a more powerful version of the system, he added.

Scheduled for release by the end of this month are two 9300 models: the Codex 9320, a complete system based on the Hewlett-Packard Co. Vectra, and the 9310 Network Management Kit, which can be used to convert an existing PC AT. Pricing ranges from $11,500 to $17,500. IBM reportedly sounded Codex on the idea of Codex products supporting Netview, but Codex has made no such announcement yet.

The official U.S. West announcement, originally scheduled for this week, has been delayed approximately a month due to some unexpected difficulties with resale contract negotiations, a U.S. West spokesman explained.

MIS

FROM PAGE 1

to extract data from a variety of IBM mainframe applications and have that data translated into PC formats, initially lacked a DB2 connection. That link has now been added. "There is a lot of interest in DB2. People who are doing tools and access technology with DB2 are getting a warm reception from customers that have adopted DB2, at least in some stage," said Alexander Crosett, general manager of Lotus's information center group.

TAC will allow users of a wider variety of machines, including workstations and minicomputers, to extract mainframe data through the use of an open-file format that will be part of the next release. "Anything that can create a sequential file in this format and send it to the mainframe can kick the engine into gear, do the extraction and receive the output," said Merv Adrian, project manager for Shearson Lehman Brothers, Inc. in New York.

"You can create the request with a text processor, with a program in C or Basic or PLI, or whatever, and send it to the mainframe. You could be a Sun Microsystems, Inc. workstation emulating a terminal, a Digital Equipment Corp. VAX, or just about anything you want, as long as you have the connectivity to the mainframe," Adrian said.

Perhaps the boldest advance is the ability to extract data without users stumbling over the difficult syntax of mainframe applications. "Currently, the user has to use the syntax native to the particular product they are talking to, which is okay if they are just talking to one product. But if they are talking to two products, you have to know two sets of syntax," said Mussie Shore, TAC product manager for Lotus.

The next release will allow users to use the 1-2-3 syntax to extract mainframe data. "If the user knows the 1-2-3 data base, they know how to get data from any of the products we support on the mainframe," Shore said.

Users of other micro applications should also find it easier to extract data. "All the parameters that were done using a mainframe interface will be issued from the PC from within whatever product you happen to be working with," Shore added.

What the new TAC will not include, according to sources, is a link to IBM's virtual telecommunications access method (VTAM) and virtual storage access method (VSAM), or a connection to mainframe production-oriented data bases. Lotus is working on these areas but is not expected to have this technology ready for the next release. Links to VTAM, VSAM and production data bases may be as much as a year away, a Lotus source said.

VSAM link popular

"The one [link] that it most widely sought after is a VSAM connection. I have no comment on it, other than it is the most sought after," Shore said.

The link to VTAM, however, is currently under development with the help of technology from Future Software, a Salt Lake City-based mainframe software firm and developer of Future Calc.

"The reason we did the acquisition was that the Future Software folks had done some terrific core-level work and driver work on operating systems technology and file systems. They worked on things like VTAM and VTAM access methods and drivers and analyzed users' interfaces," Crosett said. Lotus is no longer marketing the Future Calc product, Crosett added.

The new link will include enhancements directed at MIS professionals. "There were a host of things we wanted to do for the DP guy, such as limiting the amount of records that a particular user could extract so that you don't run into a situation where a user is attempting to download 10,000 records," Shore said. "We are also enhancing the error logs and logs which help determine the usage of the system and the distribution of use. For example, how many people are going to Information Builders, Inc.'s Focus, how many to SAS Institute, Inc., when are they doing it, how much CPU time is involved in doing it, etc."

The product, which has shipped since September 1986, has encountered a long sales cycle typical of mainframe products. Many users are waiting for enhancements before implementing the technology, a situation that Lotus expected. "Users want us to connect to everything, including the kitchen sink. They've got it all in their shops," Shore said.

MIS market tough

So far, Lotus has found the MIS community to be a tough but worthwhile sell. "It is not an easy market to sell into. Depending on the size of the company and the size of the processor, there can be as many as three different parties involved in the decision: the end-user champion, the information center person who knows the mainframe and the MIS manager," Crosett said.

Feedback and criticism from interested users have strongly contributed to the product revision.

"Always when you come out with a product like this you get smacked around the head and ears, and you learn an awful lot about what else needs to be done. Then it is just a question of time, money and effort to get the required features," Crosett said.

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Network hybrids stillborn; early users say promises can't be met

BY ELISABETH HORWITT
CW STAFF

A new breed of hybrid network offerings still do not live up to vendors' promises, according to users who have evaluated and postponed purchase of such products.

True hybrid networking, which ideally would provide cost-effective, flexible integration of private lines and carrier-based services, will probably not be delivered until the advent of Integrated Services Digital Network (ISDN) — which is still several years away, industry experts say.

"The whole point of hybrid networks is that you can put your own switches in where it's economic and go with public services where it's not," says Ronald West, telecommunications manager with New York law firm Shearman & Sterling.

Turning to hybrid net

The law firm recently considered hybrid networking as a way to turn one of its headquarters buildings in New York into a hub supporting two T1 connections: one going to another Shearman & Sterling site several blocks away, and the other hooking up to the nearest New York Telephone Co. central office via the local exchange carrier's dedicated T1 service, Flexpath (see diagram at right).

The law firm thought it would realize significant cost savings by using two interconnected T1 links instead of dozens of individual dial-up line connections between its two headquarter sites and New York Telephone's facilities. West discovered that by using the Flexpath T1 connection only between the main headquarters and the local exchange carrier, the firm would save 50% of the cost of using individual lines.

Once the Flexpath channel reached New York Telephone's site, Shearman & Sterling wanted the local exchange carrier to demultiplex the 1.5M bit/sec. bandwidth into 64K bit/sec. subchannels and route them to various sites within the greater New York area. The firm wanted to allocate 10 lines to New York Telephone's direct-dial network, 10 to dedicated connections and four to AT&T's interexchange WATS service, West explains.

Mix-and-match idea nixed

However, New York Telephone currently does not allow users to mix and match the types of services that are accessed by a single T1 line. Therefore, Shearman & Sterling would have to designate one T1 line for dial-up calls, another for dedicated lines and a third for access to AT&T WATS. As this would eliminate most cost savings that the law firm might have gained by the setup, Shearman & Sterling abandoned the idea, West explains.

"We're not serving as well as we'd like customers who want to mix and match services, but whose requirements do not justify T1 links," admits Robert Block, New York Telephone associate director of product management. The carrier still routes everything in T1 blocks; ISDN will make it possible to route individual 64K bit/sec. channels to different services, but not until 1988 or 1989, he adds.

About half of the 22 divested Bell operating companies provide T1 demultiplexing services similar to New York Telephone's, but mixing and matching dedicated and public, local-exchange and interexchange tariffs on the 64K bit/sec. direct-system output (DSO) level would take major upgrades to the companies' existing switching systems, according to Thomas Nolle, president of Haddonfield, N.J., consulting firm CIMI.

'Geography against them'

"And geography is against them, because they don't have enough customers with multiple sites in one region that can cost-justify providing a particular enhanced service," Nolle says.

The looming advent of ISDN is one barrier to the local carriers' implementation of a proprietary DSO bandwidth allocation system that would become obsolete as soon as the new standard arrives, Nolle points out. AT&T also is rumored to be waiting to introduce more dynamic bandwidth allocation services until it can ensure that they are ISDN-compatible.

The two major obstacles to widespread hybrid networking are user education and carrier-to-customer-premise equipment incompatibilities, according to John Darpino, president of Woodbury, N.J., value-added data communications systems reseller John Darpino Associates, Inc.

Hybrid networking is already playing a major role in the network planning of approximately 10 company representatives interviewed by Darpino. Many of Darpino's clients are "cognizant of emerging carrier services and want to leave open the possibility of taking advantage of them," he says.

Like Shearman & Sterling, Chase Manhattan Corp. is not currently interested in hybrid networking — primarily because carrier services do not provide the same flexibility and functionality as private T1 networking, according to Walter Romanowski, second vice-president of telecommunications.

"We want to do our own dynamic channel switching, diagnostics and backup and only use AT&T central offices to pass through dedicated lines," Romanowski explains. "Everyone I've talked to says it takes 20 to 30 minutes to reallocate bandwidth using AT&T's Customer Controlled Reconfiguration service."

Several high-end T1 switch vendors offer dynamic reconfiguration of bandwidth, as well as flexible reconfiguration of subchannels down to the 2.4K bit/sec. level, while AT&T does not. When the carrier brings out such tariffs, Chase will "definitely look at AT&T's network services, although we could already be fully installed by then," Romanowski notes.

Keeping hybrid door open

To keep the door open for future hybridization with carrier services, Chase Manhattan is only considering T1 switches that support D4 framing protocols. These determine how transmissions are packaged and routed by AT&T's Digital Access and Cross-Connect System (DACS) central office system.

Timeplex, Inc., Network Equipment Technologies Co., Cohesive Network Corp., Infotron Systems Corp., Avanti Communications Corp. and Integrated Telecom Corp. are among the vendors that have announced compatibility with D4 framing protocols.

However, D4 compatibility is not enough to guarantee the kind of hybridization Romanowski envisions, in which Chase Manhattan users could use the T1 switch vendor's network management system to troubleshoot and reconfigure channels on both the public and private sides. "We want to be able to use our T1 box to route 64K bit/sec. channels out of an AT&T central office," Romanowski says. He adds he is not sure it is reasonable to expect "all the T1 vendors to use the same protocols, since it means throwing out all of their proprietary software."

D4 primarily an alternative

With the self-proclaimed exceptions of Avanti and Integrated Telecom, the majority of T1 vendors offer a D4-compatible interface as an alternative to, not an intrinsic part of, their T1 networking systems.

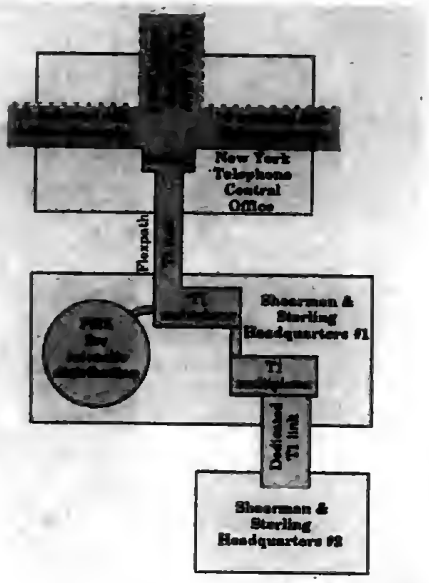
For example, an optional D4-compatible interface on Timeplex's Link/2 T1 switch allows users to interface with AT&T central office-based services at the 64K bit/sec. level, according to Timeplex product manager Joseph Mocerino. The trade-off, however, is that this interface precludes use of Timeplex's native protocols, which support such features as subrate digital multiplexing, remote diagnostics and data networking.

Network management is also "a bit of a problem," according to Mocerino, since DACS-based services do not provide the same functionality as Timeplex's switch, and the Link/2 D4 mode does not allow for managing AT&T-based network links.

Timeplex is currently working on interfaces with other T1 vendors' supervisory systems — but not with AT&T's, Mocerino says.

Shearman & Sterling's vision of a hybrid network

Headquarters #1 acts as hub connecting Headquarters #2 with other sites in the region, as well as with AT&T interexchange WATS service.



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VM keys IBM publishing strategy

Will link PC-DOS, 9370, workstations; Windows won out over Topview

BY JEAN S. BOZMAN
CW STAFF

LOS ANGELES — IBM's VM operating system will be the glue that binds the company's PC-DOS desktop publishing systems to its Unix-based RT Personal Computer engineering workstations, an IBM executive said at the Seybold Seminar on publishing, held here last week.

The company's publishing strategy, which IBM has described in measured doses over the last two weeks, uses the 9370 as the hub and PCs and RT PCs as separate publishing workstations.

"We will not be building separate, independent publishing products," said Merry Quackenbush, director of IBM's Media and Publishing Systems Group, which will market IBM's forthcoming publishing products. "We will build on the IBM 9370, which will give us a wide range of host solutions, and we will build on standard PC technology as a superb base for publishing applications."

IBM is developing additional utilities that will run on the 9370 under VM to tie together PC and Unix publishing documents. VM currently supports guest operating systems, including Unix, and will be enhanced to support specific RT applications. "VM's Unix utilities will be augmented," Quackenbush said, "to allow RT Unix applications to be supported." From there, combined documents can be sent upstream to an IBM 3090 mainframe for high-speed laser printing at a centralized corporate printing center.

In the next two months, the first batch of PC-DOS solutions should appear, Quackenbush said. IBM previously has said it will support Microsoft Corp.'s Windows, Adobe System, Inc.'s Postscript page description language and PC-DOS.

Topview deemed inadequate

The PC systems will run applications written under the Windows environment, rather than IBM's own Topview windowing system. Topview does not provide adequate graphics support for publishing applications, Quackenbush said. However, she added that IBM is not abandoning Topview, which it will still use in less graphics-intensive applications.

"Topview does not fit in the graphics environment, and we all know that graphics is essential to publishing," Quackenbush said. "So we were forced to move to another standard."

IBM's desire to follow industry standards also led it to endorse the Postscript page description language over an internally produced alternative, Jeff Mason, director of IBM's Boulder, Colo.-based Publishing Systems Independent Business Unit, told the recent Corporate Electronics Publishing Systems conference in Chicago.

IBM's RT — the company's only Unix workstation — is primarily used as a computer-aided design and manufacturing engine but also runs the Interleaf, Inc. publishing package, which can combine text with graphics and prepare a document for laser printing.

PC applications will not be able to directly communicate with those on the RT, according to Quackenbush. Rather, large enterprises will rely on VM-based mainframes to graft together high-resolution, vectorized drawings from RTs with text produced on either a PC or a mainframe terminal under VM, she continued.

The VM links will prove important to IBM's overall publishing strategy, Quackenbush said, since IBM believes about 40% of the $6 billion generated from electronic publishing solutions in 1990 will come from large manufacturing corporations that will have both RTs and PCs in place.

Cart pushing horse?

Some conference attendees said the industry is forcing IBM to move to certain popular publishing standards — not the other way around. IBM had to ensure that third-party systems developers would be comfortable supplying solutions for IBM's PC platform. This stance will allow IBM to leverage its existing base of PCs, numbering in the hundreds of thousands, into publishing workstations through the simple addition of specialized color displays, software and function cards, the attendees added.

Quackenbush partially confirmed the analysts' theory. "Our intent is to have an open architecture to welcome third-party products, but it is also our intent to provide proprietary products for the PC," she said. "The announcement of IBM publishing standards allows for a wider range of applications development."

Quackenbush also elaborated on the company's decision to launch publishing solutions on the PC rather than the RT. "PC-DOS already has strong customer acceptance, and our objective will be to protect the investments our customers have already made in IBM."

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Desktop publishing wave misses MIS

BY PEGGY WATT
and JEAN S. BOZMAN
CW STAFF

LOS ANGELES — While heralding a second wave of desktop publishing technology, most systems suppliers who addressed an industry seminar here last week declined to address MIS concerns for integrated systems.

Future products, many of them scheduled to be announced this year, will feature higher-speed processors, such as the Intel Corp. 80386 and Motorola, Inc. 68020. Speakers at the Seybold Seminar said the products will also include advanced graphics processors to relieve the CPU of cumbersome computational tasks, color monitors and high-resolution screens, as well as more capable printers.

One example of such design is the Apple Computer, Inc. Macintosh II workstation, unveiled March 2. "The Mac II is a response to user demands for high-resolution graphics, Unix and MS-DOS applications, an open architecture and expandability," said Larry Tesler, vice-president of advanced technology.

But while speakers from Xerox Corp., Hewlett-Packard Co. and others spoke of features, speeds and windowing capabilities, few addressed integration concerns.

"Everybody was talking about their own technology," said Howard Woolf, manager of Digital Equipment Corp.'s Publishing Systems group. "But we must help the customers solve their companywide problems."

Two companies that addressed integrated corporate-wide systems were IBM and Interleaf, Inc. An IBM representative discussed plans to tie Personal Computer and workstation systems to its VM mainframe architecture (see story page 12). Interleaf, a leading vendor of workstation publishing software, announced plans to provide integrated workstation and PC-based publishing systems with large systems software the company plans to make available for IBM mainframes and DEC VAXs (see story below).

Overall systems in hand

But many users in attendance seemed not to be thinking of overall systems solutions. "We really have total control over our in-house publishing systems," said one manager of a nationwide retailing firm. Her group rarely interfaces with corporate MIS and would like to avoid centralized oversight of their systems.

And yet, such control is virtually inevitable, particularly in the IBM and DEC enterprisewide corporate publishing solutions. Until recently, in-house publishing has involved either high-end, dedicated systems or use of a PC-based system with a laser printer.

"Publishing is an application that is forcing the issue of control over who controls the data," said Tony Bove, industry analyst and editor of the "Bove and Rhodes Inside Report on Desktop Publishing."

'Must structure data'

Some of the users were concerned about the need to build links to other host-based systems. "We are really going to need to structure our data to make it available to others in the company," said one systems planning specialist from a New York firm. "And the minute you structure your data, you're into information management."

Until now, few networking solutions existed. But DEC has unveiled an enterprisewide networking scheme to link in-house publishing applications and IBM is planning its series of 1987 host-oriented products.

Other vendors, such as Apple, are planning to provide gateways to these corporate networks but do not plan to provide such extensive publishing architectures themselves.

Others avoided the issue, focusing instead on specific features. Roger Archibald, product marketing manager for the HP Laserjet printer, spoke of the company's page-description languages. In addition to the widespread use of its Printer Control Language for directing printer output, HP wants to support the Imagen Corp. Document Description Language. HP's endorsement is a minority choice amid widespread acceptance of Adobe Systems, Inc.'s Postscript, which recently gained IBM's endorsement.

And Xerox is formalizing a color-support software language that would allow for true-color reproduction on a variety of output devices. Postscript developer Adobe is also refining its technology. "We hope during this year, or early next year, to see hardware devices to support color image output," said John Warnock, president of Adobe.

Interleaf plans unified system

BY ROSEMARY HAMILTON
CW STAFF

LOS ANGELES — Interleaf, Inc. announced ambitious plans here last week to provide an integrated, corporatewide electronic publishing system by offering software for mainframes and personal computers.

The products, most of which are scheduled for release late this year, would greatly expand the vendor's product line, which is now based on 32-bit workstations from Sun Microsystems, Inc., Apollo Computer, Inc. and Digital Equipment Corp. The vendor also provides its Technical Publishing Software (TPS) on the IBM RT Personal Computer.

"We want to give MIS directors more control over what is now a fragmented publishing operation," Interleaf President David Boucher said.

Boucher provided few details, however, on how a user will integrate the publishing operation. If a user were to install the full Interleaf lineup, it could be running on at least three different operating systems. But Boucher stressed his intent for Interleaf to work with the customer as a systems integrator. "The idea is to work with the user rather than just present them with a package," he said.

Boucher said he expects to launch such an effort with the new mainframe software at a few pilot sites this summer. Interleaf plans to port its software to both the IBM MVS and DEC VMS environment, and the firm is currently investigating the possibility of porting it to the IBM VM operating system, Boucher said. It also plans to work with users to integrate the Interleaf software with a customer's data base management system, although Boucher would not specify what data base management systems this would include.

Boucher could not provide installation fees, but said the price range for the software on an IBM MVS system would be between $50,000 and $100,000, depending on the configuration.

In addition to the mainframe software, Interleaf announced two personal computer-based systems. A PC Textstation will be offered as a component of either a mainframe- or workstation-based system. It is designed as a writer's tool and will provide users with the capability to write and edit text. It does not provide graphics or page layout capabilities. The software will be priced in the $200 to $600 range and will be available in the third quarter, Boucher said.

Another personal computer-based tool that has not yet been priced but is expected to be available in the third quarter is the Interleaf Viewstation. This reportedly will provide users with a read-only capability of documentation.

Also included in last week's announcement is the next release of the Interleaf's TPS. Release 4.0 will be available in the fourth quarter of this year. Users of Release 3.0, introduced in January, can upgrade free of charge. Release 4.0 will contain the features necessary to interface with mainframes, the vendor said. It will run on the workstation-based systems as well. The price of TPS for workstations will remain at $15,000.

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Mixed bag seen for high-tech growth

Analysts say minis, PCs to sprout while mainframe sales, MIS spending struggle

BY ALAN J. RYAN
CW STAFF

While this will be a slow year overall for growth in the computer industry, vendors that are product- and cycle-driven will be more successful than their less ambitious competitors.

That is the prediction of industry analysts from Framingham, Mass.-based market research firm International Data Corp. (IDC) at the firm's 22nd Annual Information Industry Briefing Session, being held around the country this month.

In his outlook on systems spending, David Moschella, IDC vice-president of systems research, said his survey of 750 data processing operations in the U.S. shows that MIS user spending will climb only 4% to 6% this year, while sales of mainframes will remain flat. Minicomputer sales may increase by as much as 10%, and personal computer sales will climb at a rate of 7% to 11%, he predicted.

Moschella said that micro unit growth will be spurred by inexpensive IBM Personal Computer compatibles and will outdistance other computer markets. However, he added, sales of units based on Intel Corp.'s 80386 processor will account for only 4% of this year's PC shipments, both because those units are focused on narrow markets and because of the lack of software written for the 80386.

Users not buying IBM

In the mainframe market, sales of IBM 3090s have declined, Moschella claimed, because many users feel they already have enough capacity, others face budgetary constraints, some are buying smaller systems and still others are enhancing their existing equipment.

Problems for the 3090, he said, are a slowdown in millions of instructions per second requirements, a lack of differentiation between the 3090 and the IBM 3080 family and the impact of used equipment.

Meanwhile, according to analyst Francis Gens, vice-president of IDC's technology management research, Digital Equipment Corp. is expected to continue to successfully tap trends that IBM finds troublesome.

DEC's beneficial transitions

Analyst Bob Randolph, director of IDC's DEC advisory service, said DEC has made some beneficial transitions in its sales approach and its organization — including separating retailers from OEMs and indirect channels.

Other DEC assets, Randolph said, include the company's use of an internal network for communications, which reduces lead times in product development and launches. He also cited DEC's acceptance of software as an important part of its product.

But these benefits could potentially be overridden by DEC's huge product line, Randolph said, adding that eventually DEC could have too many people trying to embrace too many markets. Randolph noted that the benefits could also be a problem for the company's sales force as sales agents try to keep track of information on the many compatible products.

William Zachmann, IDC's vice-president of research, predicted that although DEC is facing some long-term challenges, including renewed competition from IBM's 9370 and RT PC, the company will enjoy continued success this year.

"DEC's momentum is not only very strong but probably growing," Zachmann said.

IBM mends weak points

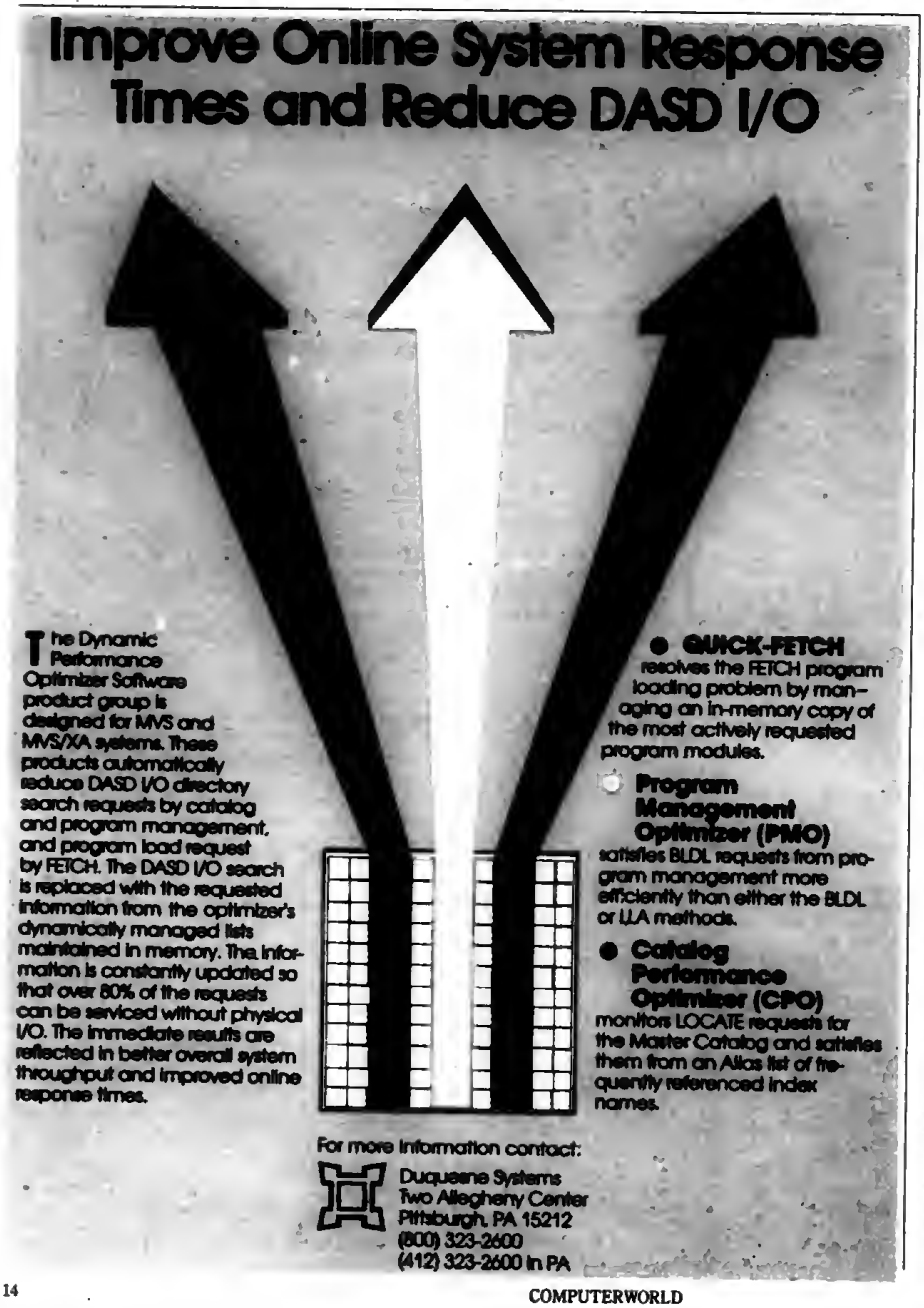
But IBM is also on the road to recovery. According to Gens, Big Blue will mend its weak points by 1989 and will likely give up margin to retain and gain market share.

When IDC's Moschella made his predictions, he said vendor success will be driven by important products, with IBM and DEC leading the way. He said DEC's VAX architecture may stand almost side by side with IBM's 9370 in a few years in number of installed users.

Moschella noted that from 1982 to 1986, VAX hardware sales grew by 20% while 9370 sales grew by just 6%.

While looking at other non-IBM mainframe vendors, Moschella said that Unisys Corp. — the firm formed by the merged Sperry Corp. and Burroughs Corp. — is moving quickly but still faces challenges, adding that there is opportunity for plug-compatible manufacturers; Cray Research, Inc. is not a real challenger, he asserted. Moschella also said that while the Honeywell, Inc./Compagnie des Machines Bull/NEC Corp. venture is a sound move, there are organizational challenges the group faces.

Specialization will continue and will prove to be an important way for many vendors to go, Moschella said. He added that there will be an ongoing shift to smaller systems and important migration to linking systems.



Korean PC clone vendors gearing up

BY OLES GADACZ
SPECIAL TO CW

SEOUL, South Korea — Look for lower prices on IBM Personal Computer, PC XT and AT clones coming out of South Korea this year.

Annual microcomputer output here has doubled each year for the past three years, and with production likely to hit one million units this year, microcomputer manufacturers are achieving greater economies of scale, which will almost certainly translate into lower U.S. retail prices.

"The retail price will drop to $1,000 for a standard IBM PC compatible with two floppy disk drives and a monochrome monitor," predicted Microsoft SA President Y. H. Jeon, who keeps a watchful eye on local licensing of Microsoft Corp.'s MS-DOS.

An Intel Korea official predicted Korea will break into three new product areas this year: laptop PCs; 300-or-1,200 and 1,200-or-2,400 bit/sec. modems, the latter having a target retail price of $200 — Anam Electric already has such modems under pilot production; and local-area networks (LAN) for IBM PC environments. He admitted the LANs are the long shot among the three.

The Korean PC story of the year may be Goldstar Semiconductor's PC 386, which debuted at last November's Comdex/Fall '86 in Las Vegas and is based on Intel Corp.'s 80386.

Pyung-Jun Min, executive director of Goldstar, said shipments of the product are slated to begin in May to an unidentified U.S.-based OEM buyer. He would not disclose the retail price.

Local vendor Oriental Precision is experiencing delays with its 80386-based product, but company officials said they expect shipments of the OP-COM 386 model to begin this summer. No other local companies have yet announced 80386-based machines.

Daewoo Telecom Co. has made strides with its Model D, producing 13,000 PC- and XT-compatible units monthly for Leading Edge Products, Inc.'s Canton, Mass.-based hardware division, but the duo has delayed introduction of an AT machine. One industry source said product specifications are still under discussion between the two partners. Daewoo officials would not comment.

Meanwhile, Daewoo Electronics Corp. has a leg up on its sister company, Thousand Oaks, Calif.-based Cordata, and is shipping AT-compatible products there. Based on the 80286 micrprocessor, the Cordata AT has a clock speed of 8 MHz and 640K bytes of random-access memory.

Hyundai Electronics Industries Co. started this year with production of the Super 16T, which features an Intel 8088-2, an 8-MHz microprocessor and an 8087-2 math coprocessor as an option.

According to Ho-Dong Kim, Hyundai Electronics export manager, the company will ship a total of 300,000 PCs this year. Hyundai's largest client to date has been the Tempe, Ariz.-based Blue Chip Electronics, Inc., which has taken delivery of the Super 16, the forerunner of the Super 16T. Kim said Hyundai Electronics will begin shipping an AT-class PC in May and that Blue Chip has expressed an interest in picking up the product.

Gadacz is a special correspondent for the CW International News Service.

Microsoft, Sun join forces in Windows cleanup

BY DAVID BRIGHT
CW STAFF

REDMOND, Wash. — With an eye toward improving its Windows operating environment, Microsoft Corp. announced last week that it has agreed to a technology exchange with technical workstation vendor Sun Microsystems, Inc.

Under the agreement, Microsoft will license Sun's Network Extensible Window System — which supports Adobe Systems, Inc.'s Postscript page description language — and the two companies will share information on technical developments and new-product plans.

Windows director of product management Tandy Trower stressed that the agreement does not concern a specific product offering. Instead, the goal is for the two firms to help one another with some common problems they have in providing windowing software for workstations.

"This agreement essentially gives us access to share some ideas, technology and ways of doing things that will allow us to improve our present products as well as our future products," he said.

Trower added that as microcomputers become more powerful with the use of Intel Corp.'s 80286 and 80386 microprocessors, Microsoft should benefit from Sun's experience with high-end workstations.

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EDITORIAL

DEC's triple play

It didn't take Digital Equipment Corp. long to discover the benefits of account control.

DEC's announcement two weeks ago of a major revamp of its high-end price structure and new members of its closed-architecture VAXBI line demonstrates that the company is ready to use its expanding customer base to wring out a few more bottom-line dollars. Officials heralded the early March announcement as a rebalancing of prices. They also said the new low-end machines would give buyers more incentive to consider the DEC alternative.

Both statements are true. A closer look at the revisions, however, suggests a three-part strategy that may ultimately cost many users more.

For starters, DEC has baited the hook with markedly improved price/performance on the low end of the VAXBI line. The preconfigured 8250 and 8350 systems offer 20% better performance than their predecessors, the 8200 and 8300, for 7% to 10% less money. That's a good deal, especially for the many IBM customers who are considering a trial installation of DEC hardware at the department level.

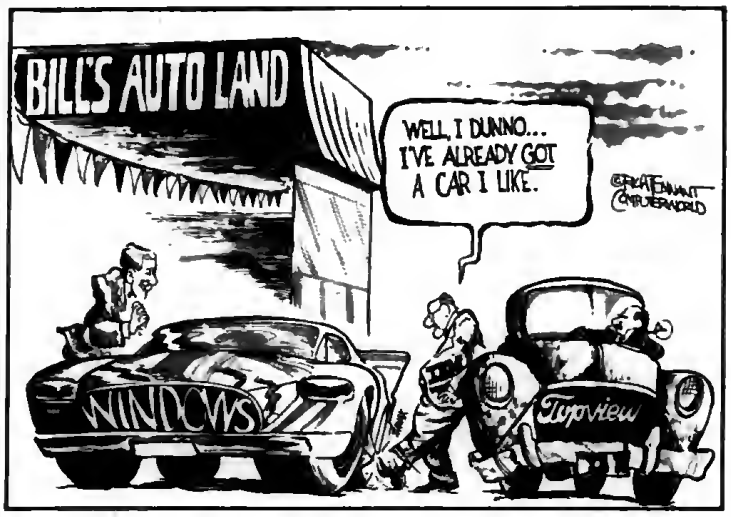
This is where DEC can begin to exert account control. DEC customers who plan to upgrade will now pay more than ever for doing so in the form of increased prices on high-end VAXs and expanded operating systems licenses. The cost of a preconfigured VAX 8800 cluster system was hiked about $115,000 and the cost of large VMS operating system licenses for Microvaxes more than doubled.

Part three of DEC's strategy is aimed at the third-party market for peripherals and memory, in which firms like Emulex Corp., System Industries, Inc. and Clearpoint, Inc. have built tidy businesses around compatible products that they sell to DEC at a significant discount. At the same time, third-party maintenance firms like TRW, Inc. and Control Data Corp. have established lower cost alternatives to DEC's pricey service contracts.

IN AN ASSAULT ON THOSE PARTIES, DEC halved prices for Microvax and VAXBI memory and reduced the price of its RA81 disk drive. What's more, all DEC hardware now comes with an added bonus: nine months of free service.

Price cuts and built-in service are good news for customers. But independent firms will now find it increasingly difficult to compete. Already hobbled by DEC lawsuits and the closed VAXBI architecture, the third parties may decide they are better off moving to other markets. That will mean fewer choices for customers.

DEC can't be faulted for taking the price actions it did. It is a profit-making company beginning to enjoy the fruits of success. However, it would also be wrong to conclude that DEC wants to continue its role as a low-cost supplier of IBM-alternative hardware. The company's growth during the last 18 months has put it in a position to exercise control of its key accounts. Users should brace themselves for the possibility of further price hikes as DEC's grip intensifies.



LETTERS TO THE EDITOR

Gambling on UPS

The article, "How interruptible is your computer system?" [CW, Jan. 26], left something to be desired in the introductory paragraphs in which the managers' choice about purchasing uninterruptible power supply (UPS) was described as a calculated gamble.

In my business of providing contract services in information systems security we perform quantified risk analyses that give enough information to take that, and similar choices, out of the gamble category. These analyses detail assets and their values, which include the business values produced by the continuing operation of the information systems, define the threats for a location and which assets would be affected, estimate probabilities of occurrence and derive loss potentials. Safeguards, such as a disaster recovery plan and/or an UPS, can reduce the loss exposure and, as long as the cost of the prevention is less than the loss potential, management will generally buy it. These are techniques that have been in use in the casualty insurance field for many years. Knowing how to apply them to information systems is the challenge.

The analyses take the decision out of the casino and make it more like other business decisions that are based on reasonable probabilities and financial considerations. A firsthand bad experience usually makes this point more effectively. There are regulations in certain business segments that require such protection, and stockholders are becoming more knowledgeable about such issues.

Edwin B. Heinlein
Heinlein Associates, Inc.
San Rafael, Calif.

Programming hats

In his response to J. Robert Riggs' article, "Twelve DP myths that just won't die," Steven Gove seems to have a hard time recognizing the validity of Riggs' arguments [CW, Feb. 2]. To begin with, Gove disputes the view that systems design can be separated from programming. "Syatems design can no more be separated from programming than architecture can be separated from engineering," he writes. I think Riggs meant to imply that the design should be completed prior to coding. After all, the architect and engineer are roughly analogous to the analyst and designer, both of whom complete their job prior to the beginning of construction. The building contractor makes no design decisions and must follow the specification, like the program coder. Gove complains, "If the design specifications are so detailed that writing a program from them is rote clerical work, then the programming has already been done." Well, yes. To pursue the analogy, those building specifications had better be explicit and complete if the building is to last.

Secondly, Riggs says, "MIS professionals seem to have an irresistible urge to begin coding before systems design is complete." Gove writes, "It is impossible to have a complete systems design before doing any coding." Why not? No one said that there couldn't be adjustments and modifications based on user input as the system was implemented.

I think if we concentrate on development activities rather than job titles, we might come to an agreement. In order to ascertain the functional requirements of a system, large or small, we perform analysis. Once we have the requirements, we can begin to devise an implementation that will fulfill those requirements, and this is called design. Design is done on a general or systems level as well as at a detailed or program level. Once this design has been created and evaluated with respect to the original requirements, the design can be implemented or coded and, of course, tested. A programmer may be called upon to perform tasks in any or all of these phases. This is fine, as long as he remembers which "hat" he is wearing.

Tom W. Dobrydney
Senior Staff Instructor
Yourdon Washington, D.C.
McLean, Va.

This week in history

March 14, 1977
The Department of Commerce's National Bureau of Standards and the Securities and Exchange Commission announce an experimental project to monitor the impact of their regulations on the ability of certain businesses to get capital funding.

March 15, 1982
Angered by the computerized collection of parking ticket fines, 400 Boston protestors, led by a local radio personality, dump copies of parking tickets into the garbage. The demonstrators say the computer continues to accuse drivers even after their fines have been paid.

Chasing the bleeding edge of technology

HARVEY NEWQUIST

Does it bother you to read about shake-ups in a company, only to hear the spokesman say there's American Way to supersede gaining a competitive edge.

mits that, well, maybe things aren't quite so merry.

It bothers me when the one company in the U.S. designed specifically to develop the world's leading-edge technologies seems to have this problem. I refer, of course, to the Microelectronics and Computer Technology Corp., or MCC.

MCC was conceived by Control Data Corp.'a then-chairman William Norris. He believed that by creating a facility for pooling the best minds from the best companies, the U.S. could maintain its technological superiority.

Twenty companies founded MCC in 1983. They chose as their leader Bobby Ray Inman — a retired admiral, director of the National Security Agency and former deputy director of the Ceotral Intelligence Agency.

The initial entry fee was $125,000, but that amount was bumped up to $1 million in short order. The first companies to invest were Advanced Micro Devices, Allied-Signal, BMC Software, Bell Communications, Boeing Computer Service, Control Data, Digital Equipment, Eastman Kodak, Gould, Harris, Honeywell, Lockheed, Martin Marietta Data Systems, Mostek, Motorola, National Advanced Systems, NCR, RCA, Rockwell International, Sperry and 3M.

MCC started by focusing on four technological areas: advanced computer architecture and artificial intelligence, semiconductor packaging, computer-aided design and very large-scale integration, and software productivity. Member companies chose areas to participate in and then sent money and men to Austin, Texas. In return, MCC would license the technology developed back to the companies that had been working on it.

Things seemed to go pretty well for America's Great Technological Hope. Reports boasted of great advancements, especially a design and expert system named Leonardo, after the artist who allegedly painted the "Mona Lisa" as a self-portrait.

A storm was headed toward the admiral's ship, however. United Technologies sold its Mostek subsidiary to a French firm, which invalidated its participation in the all-U.S. MCC.

Then the admiral himself decided it was time to turn the helm over to someone else. He wanted to get involved with the business of actually bringing electronics technology to market. Last September, he announced his resignation from MCC.

Parts of the ship were already taking on water. Citing financial troubles, BMC withdrew at the close of 1986. Gould pulled out, apparently due to internal reorganization. The consortium quickly cut its admission price from $1 million to $250,000.

Then the hull started to crack. In two days in January, Allied-Signal, Unisys and Lockheed dropped out. The resignations would all have occurred in one day, but Lockheed's notification was delayed in the mail.

Hewlett-Packard purchased BMC'a shares, and Westinghouse signed up, picking up some of the slack caused by the desertions. Company spokesmen claim this flux is "no big deal" and that the problem will be rectified by year's end. I remember the semiconductor industry saying the same thing in 1985.

The fact is companies are leaving MCC, and few others are beating down the door to get in. The exodus hurts, especially when it involves Unisys, one of only three companies involved in all four areas of MCC research, thereby contributing many millions to the budget.

The difficulty comes from putting competitive companies into the same environment and expecting truth, justice and The American Way to supersede gaining a competitive edge.

To try to get everything back on an even keel, MCC just hired Grant Dove to run the company, effective in July. Currently, Dove is an executive vice-president at Texas Instruments and between now and July will have a break-in period before he assumes the role of chief executive officer.

You don't pursue the bleeding edge of technology without running into egos, personal and corporate, amoog other barriers.

MCC's plight can be summarized by a comment from an engineer working there. I asked him how things were progressing. "Not too bad," he said. "I think that XYZ is holding back some of the best information on parts of their project so they can use the good stuff themselves.

"Besides, we're doing the same thing to them."

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

The rights to machine behavior

Attainable computer responses vs. strictly protected encoding

READER'S PLATFORM

DAVID CAREW

A sound and well-established tenet of our copyright law is that an idea may not be protected by copyright. The words used to express the idea are protected; the idea itself is not.

The copyright law is now being used to protect computer software. While this approach itself may be far from ideal, it is clear we are committed to it, at least for the time being. We have, by case law and legislation, extended our copyright concepts to cover computer software. Given this extension, there is an exact analog to the principle that ideas must be free, which clearly and unequivocally must be applied to software.

The principle is this: The machine behavior produced by a software program is not subject to copyright protection; the encoding that produces the behavior is. The essential difference between a human's writing, which is copyrightable, and computer software, also copyrightable, is that the former's basic purpose is to communicate ideas, while the software's purpose is to produce particular machine responses. Software-driven machine response has long since become subtle and complicated enough to be regarded as behavior, at least by ordinary mortals not engaged in philosophical hairsplitting. A programmer's job is to elicit complex behavior from a mere machine.

Not allowing authors to express in their own words an idea previously expressed under copyright would result in absurdities and interlocking claims and counterclaims that would ultimately be harmful to everyone. This traditional argument weighs the good of all against a potential short-term advantage that might theoretically be due the originator of an idea.

The traditional argument further holds that virtually all original ideas are actually a synthesis and extension of previous ideas, applied in a novel way or to a different circumstance. For this process of synthesis, and improvement to flourish, ideas must be freely adaptable, while the commercial value of any particular expression of ideas must be protected.

Synthesis and extension

In a directly analogous way, new and useful computer behavior is often the result of synthesis and extension of what went before: Lotus Development Corp.'a 1-2-3 is an extension of the previous Visicalc, synthesized with some fundamental data base and graphics behaviors. The Apple Computer, Inc. Macintosh's friendliness, windowing and point-and-click mouse are admittedly derived from earlier, basic research by computer scientists, mostly at Xerox Corp.'s Palo Alto Research Center.

For this progress to continue, any attainable computer behavior must be freely available, while the encoding that produces and embodies such behavior must be stringently protected. Whether this encoding is in source or object form, human- or machine-readable, firmware or disk-based might be regarded as a detail not relevant to the basic protection.

Having benefited greatly by freely adapting the behavior of previous software, it is ironic to see companies like Lotus and Apple now suing other, smaller companies not because their code has been copied but because the behavior of their software has been, allegedly, too closely duplicated.

The present confused infancy of software copyright law is allowing such cases to be heard and sometimes won. Down that path lies the stagnation and ruin of an activity that is growing ever more important to the health and well-being of our economy.

In the course of human affairs, no one can have an exclusive right to an idea. In the software arena, no one should be allowed the exclusive right to particular machine behavior.

This analogy may be clear and natural to the computer professional; it seems emphatically unclear to the judges and legislators of this land.

Carew is a systems analyst for Cibar, Inc., a software house and consulting firm in Colorado Springs, Colo.

The pitter-patter of electronic footprints

PETER BARTOLIK

Civil libertarians have long decried the attention of government agencies to the "intelligence" value of certain computer technologies. Yet, once again, a presidential administration has demonstrated — inadvertently — that technology is a great weapon for the preservation of the Constitution.

After Richard Nixon's historic joust with the wonders of audio recordings, who would have ever guessed that government dirty tricksters would again fall into essentially the same trap? Lt. Col. Oliver North, it seems, was so enamored of the White House's electronic-mail system that the National Security Council aide left a magnetic trail that proved crucial in unraveling much of the complicated and well-camouflaged Iran arms scandal.

Messages sent by North and others over an IBM Professional Office System provided, according to the much-publicized Tower Commission Report, "a first-hand, contemporaneous account of events" [CW, March 2]. As any good computer systems operation must do, the White House Computer Agency dutifully performed archiving of electronic-mail traffic.

The downfall of the Watergate and "Irangate" miscreants provides adequate proof that technology is a valuable asset in the protection of the basic checks and balances crafted 200 years ago. This year we celebrate the bicentennial of the U.S. Constitution and its authors, who could never have dreamed of the shape of government today or its potential for mischief. It is an absolute marvel that the document remains resilient in an era when just about any communication anywhere can be electronically intercepted.

It is the special protections of the Constitution that provide agents of democracy with access to the tools used by those who, wittingly or not, seek to work outside of its strictures.

Once I was one of those who feared the Big Brother potential of technology. I find those fears waning. Government may have computer matching, electronic surveillance and who knows what other capabilities; yet, Watergate and the Iran scandal show that technology can do at least as much good as it can do harm.

When those who abuse power persist in leaving electronic footprints, a little nervousness about the potential of government information systems seems a small price to pay.

Bartolik is *Computerworld*'s news director.

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SOFT LINE

William H. Inmon

Denormalize for efficiency

One of the foundations of relational theory is the normalization of data. In a nutshell, normalizing data causes data elements to be arranged so that all elements in a group depend for their existence on the key of the group.

Indeed, normalization of data — when executed properly — results in many worthwhile benefits. But there is at least one major drawback to the normalization of data, and that drawback is poor system performance.

Normalization of data leads to data base designs in which there are many independent collections of data. For anything but small "toy" data bases, these data collections are usually stored in separate physical locations. As long as processing requires access to only one collection of data, normalization of data does not affect performance.

But when processing requires that two or more collections of physically separate data be accessed, then the physical separation of the data requires that I/O be done — a process that otherwise would not have to be done had the data not been normalized. And when unnecessary I/O is done, system performance suffers. It is noteworthy that both on-line and batch

Continued on page 20

Government promotes Posix

Agencies support adoption of Unix standard to foster portability

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The federal government, accounting for about one quarter of the Unix processor market, is using its clout to push for adoption of the emerging Posix standard.

The effort, led by the National Bureau of Standards (NBS), is another sign of the government's increasing influence on the Unix marketplace, both as a major buyer of Unix systems and as a standards setter, according to market analysts and government officials. The Posix standard is intended to make applications portable across the various Unix-derived operating systems.

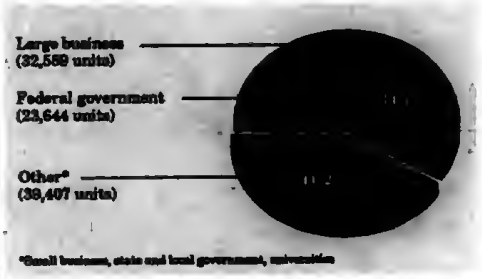
The government's clout is "one of the reasons we think Posix will probably be successful," according to Richard Kuhn, a computer scientist with the NBS Institute for Computer Sciences and Technology.

"The government needs to specify an operating system in a vendor-independent way, and all of the vendors are probably going to wind up supporting Posix in order to deal with the federal government," he explained.

Posix, or the standard for Portable Operating Systems for Computer Environments, is being developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE), with assistance from the NBS. So far, AT&T, IBM, Digital Equipment

Continued on page 22

Unix-based systems
U.S. shipments in 1985



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP
CW CHART

Mainframe link lifts design tool

BY CHARLES BABCOCK
CW STAFF

CAMBRIDGE, Mass. — Index Technology Corp. has announced it is distributing a link between Excelerator, its software analysis and design product, and a virtual disk on a mainframe.

The link allows an Excelerator user, working at a personal computer, to store and share data on IBM mainframes running the MVS operating system, said Chris Grejtak, vice-president of marketing.

The link, called the Virtual Diskette Access Method, was developed by Phaser Systems, Inc. of San Francisco. The design and analysis data stored on the virtual disk can be accessed by a personal computer as if it were stored on the PC diskette, Grejtak explained.

Users develop and revise systems diagrams and validate design data with Excelerator, and any changes are automatically updated on the mainframe's virtual disks.

The link backs up individual project dictionaries and files to the mainframe.

The Virtual Diskette Access Method link is available for $9,000. Excelerator is available at $8,400.

IBM bolsters System/38 Mapics II

BY ROSEMARY HAMILTON
CW STAFF

RYE BROOK, N.Y. — IBM boosted the functionality of its Manufacturing Accounting and Production Information Control System (Mapics II) for its System/38 minicomputer with an announcement last week of three application packages.

The System/38 Mapics II offering is now on a par with System/36 Mapics II, IBM spokesmen said.

Included is a purchasing module, a lot-location management package for the general inventory management module and an inventory management package for the process industry.

Tracking orders

The purchasing module, set to be available in December at a one-time charge of $12,500, must be used in conjunction with the inventory management module or the recently introduced Inventory Management for Process module. It allows users to create purchase orders and keep track of an order until it is closed out, IBM said.

The Location/Lot Management package can be purchased for $5,700 for use with the inventory management module. Users can track where inventory items are stored in a warehouse and use that data for the overall management of inventory, the vendor said.

The Inventory Management for Process module is based on the inventory management module and includes the features of Location/Lot Management. It allows process manufacturers to keep track of the quantity and location of material used. The module is scheduled to be available at the end of this month for $23,000.

Inside

- Federal agencies turn to Unix for administrative applications. Page 22.
- Group 1 Software announces software for plant loading. Page 26.

Figure 1

PART	DESC	UM	QOH	PART/SUPP		SUPPLIER	ADDRESS	NAME	PHONE
01258-Q	ball bearing	box	608	0001	Jones Supp	ACE Hdware	123 Main	E John	110-998
01258-QX	bearing mount	uni	90	0001	Smith	Apple Supp	456 Broad	N Diam	099-872
01270	base plate	uni	1907	0004	ACE	Artle	90 14th St.	G Frey	997-776
01270-R	gasket	box	605	0004	Jones Supp	Aston	12 Grand	C Laup	889-887
•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•

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The Change Control Experts.

Denormalize

FROM PAGE 19

system performance are adversely affected by a high degree of normalized data.

As a consequence, the data base designer often has to trade off the aesthetics of data normalization against the reality of system performance.

There are several design techniques that can be used to denormalize data to enhance performance. A simple, normalized data base is shown in Figure 1.

Consider the I/O required to connect a part with the appropriate supplier using the normalized data structures shown in Figure 1. I/O must be done to locate the part data.

Then more I/O is done to scan the part and supplier cross-reference data, enter the part number cross-reference and locate the supplier of the part. More I/O is done to access supplier data — based on the key of the supplier that has been obtained from the cross-reference data base.

Now consider a simple design practice that denormalizes data, as shown by Figure 2.

In that illustration, the key of a supplier is directly contained in part data. As such, the part data is denormalized because the existence of a supplier does not depend on the existence of any given part. The amount of I/O required now to go to a supplier from a part (at least the primary supplier for a part) is minimal. Only the access of the part data requires I/O.

This direct relationship between part and supplier is accomplished much more efficiently than if the data were normalized.

Of course, only one supplier can be obtained per part, but depending on the application, that may be sufficient.

If the programmer wishes to obtain more than the primary supplier, additional I/O will be incurred as the cross-reference and the supplier data base is accessed.

Improved performance

A second option — for the improvement of performance available to the designer — is the placement of the key of multiple suppliers in the part record, as shown by Figure 3.

In this case, the key of multiple suppliers per part (up to three suppliers in the example) are carried. Now the programmer can access as many suppliers as desired (that is, as many as are carried in the parts record) without having to access the cross-reference data base.

The I/O that carries the programmer to the parts data also carries the programmer to the keys of the supplier as well.

But suppose more than just

the key of the supplier is required. Suppose the programmer wishes to see the address and phone number of the primary supplier. Either the design in Figure 2 or Figure 3 will allow the programmer to bypass the cross-reference data base, but extra I/O must be done to access the supplier data base to get at the name and address.

A third option for denormalization is shown by Figure 4.

In Figure 4, supplier data other than key is carried in the parts record. In this case, name, address, phone number and so on can be accessed in the same I/O that is required to access the part record for the primary supplier.

There are some obvious drawbacks to the forms of denormalization discussed here. One drawback is in update processing. When the values in the supplier data base change and the data has been denormalized, data values must be changed in multiple places, thus incurring extra I/O for update. When data is not changed in multiple places and ought to have been, discrepancies in data values occur. Normalization then favors efficiency of update processing at the expense of access-only processing.

Disadvantages mount

But there are other drawbacks to denormalized data. More storage is required. The complexity of processing can rise exponentially. And so the disadvantages mount. But the payoff for the denormalization of data is reduced — potentially significantly reduced — in the I/O required for the access of data.

The designer should not blindly denormalize data without good reason. The designer should balance normalization of data with performance considerations in concert with the application and system needs. As a rule, data should be entirely normalized as the design is being conceptualized, then denormalized in response to the performance requirements of the system.

The introduction of redundancy of data into a system design and the consequent denormalization of data should be done deliberately.

The following guidelines are at least a start in the balancing of the trade-off between normalization and performance.

- Data should be normalized, if at all possible.
- If data must be denormalized, the first approach should be that singular key values should be spread over multiple occurrences of data.
- When denormalization of singular key values will not suffice, multiple key values should be spread over multiple occurrences of data.
- When denormalization of multiple key values will not suffice, non-key data should be spread over multiple occurrences of data.

In the case where non-key data is denormalized, two design practices need to be followed: Key data should always be carried with non-key data, even when key data may not be needed by the application, and a "system of record" needs to be established so that detailed, primitive data elements have a single source.

With a system of record, at least the discrepancies in data values can be reconciled when they occur.

Inmon is a senior principal with American Management Systems in Lakewood, Colo., and an author on the subject of data base design.

Figure 2

PART	DESC	UM	QOH	SUPPLIER
01258-Q	ball bearing	box	608	ACE Hardware
01258-QX	bearing mount	unit	90	Jones Supp
01270	base plate	unit	1907	ACE Hardware
01270-R	gasket	box	605	ACE Hardware
•	•	•	•	•
•	•	•	•	•

The primary supplier for a part is added to part number data.

Figure 3

PART	DESC	UM	QOH	SUPP1	SUPP2	SUPP3
01258-Q	ball bearing	box	608	ACE Hard	Jones Supp	—
01258-QX	bearing mount	unit	90	Jones Supp	—	—
01270	base plate	unit	1907	ACE Hard	Jones Supp	Anton
01270-R	gasket	box	605	ACE Hard	Jones Supp	Smith
•	•	•	•	•	•	•
•	•	•	•	•	•	•

Up to three suppliers for a part are added to the part number data.

Figure 4

PART	DESC	UM	QOH	SUPPLIER	ADDRESS	NAME	PHONE
01258-Q	ball bearing	box	608	ACE Hardware	123 Main	E John	110-9980
01258-QX	bearing mount	unit	90	Jones Supply	13 17th St.	G Harrison	889-7760
01270	base plate	unit	907	ACE Hardware	123 Main	E John	110-9980
01270-R	gasket	box	605	ACE Hardware	123 Main	E John	110-9980
•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•

Supplier related data other than foreign key information is added to part number data.

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Government

FROM PAGE 19

Corp. and other vendors have announced their support for Posix, which is still in an embryonic stage.

Posix defines a standard operating system interface and applications environment to support applications portability at the source-code level.

Applications that meet the Posix standard can be distributed in source code form and will recompile and run under any Unix system that conforms to the standard.

Once Posix becomes an IEEE full-use standard at the end of this year, the NBS is expected to make it a federal information processing standard — for use in procurement documents — six to 12 months later.

Kuhn explained that the primary reason federal agencies turn to Unix is that they want applications portability. The government is under special pressure because its contracting rules require open competition, so the government cannot specify a single hardware or operating system vendor.

The federal government purchased nearly 24,000 Unix-based processors worth $805 million, or roughly one quarter of the U.S. Unix market, in 1985, according to a forthcoming Unix study by International Data Corp. (IDC), a Framingham, Mass.-based market research firm.

IDC estimated that 70% of all government requests for contract bids include Unix as a requirement, although several government officials said that estimate is somewhat high.

"This trend has provided a lot of the incentive for proprietary operating system vendors such as IBM, DEC and, most recently, Wang Laboratories, Inc., to offer Unix implementations," IDC's "Unix Perspective" newsletter reported.

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IRS, Army enroll Unix

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The quest for portability and vendor independence has led organizations such as the Internal Revenue Service, the Federal Judicial Center and the U.S. Army to adopt Unix as their standard operating system for certain data processing operations, analysts and agency officials say.

Federal agencies are turning to Unix not only for scientific and engineering work but also for general business and administrative applications. The IRS chose Unix as its standard for small to medium-size systems because it wanted hardware portability and applications portability, explains Eugene J. Barbato, chief of the user assistance branch.

He says the Unix systems are in 100 major field offices handling administrative tasks such as inventory control.

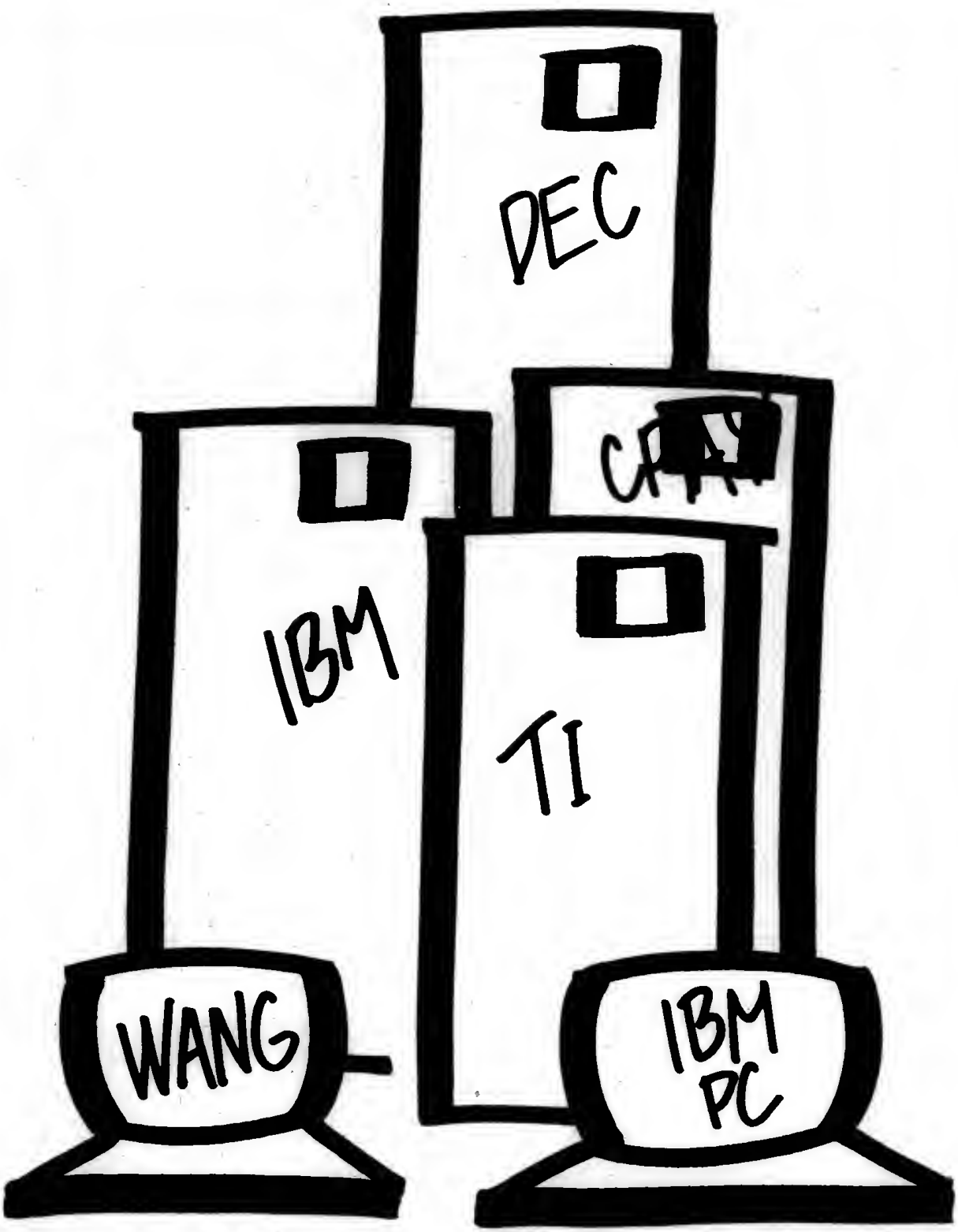
The IRS has up to 430 Zilog, Inc. System 8000 supermicros running Informix Software, Inc.'s data base management system and "a lot of C code" written by the IRS for specific applications, Barbato notes.

Similarly, the Federal Judicial Center has standardized on Unix for the administrative and case-management systems at federal courts throughout the country [CW, Nov. 11, 1985].

Under a contract won by the former Sperry Corp., now Unisys Corp., the courts use Arete Systems Corp. minicomputers, Unify Corp.'s DBMS and C code on top of it for the applications, says Robert Borochoff, a research computer scientist at the Federal Judicial Center.

Analysts say there is strong interest in Unix among the military departments, but there also are concerns about the operating system's notorious lack of security features [CW, Jan. 26].

One vendor that has addressed the security problem is Gould, Inc.'s Computer Systems Division, based in Ft. Lauderdale, Fla., whose UTX is the first Unix system to obtain certification by the government's National Computer Security Center.



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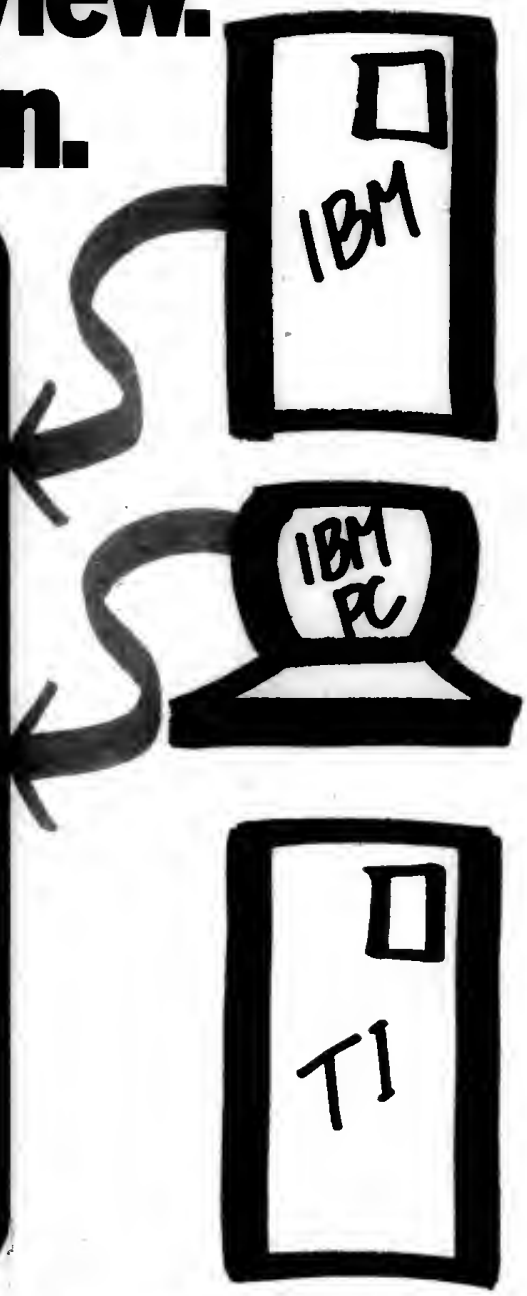

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NEW PRODUCTS

Systems software

Synergy Health Systems, Inc. has announced the **Advanced Claims Processing Systems** (ACPS), on-line software for health benefits processing.

The software is said to automate claims administration, processing and verification. It also gathers data for benefits analysis. In addition, users are said to be able to change health plan parameters. ACPS is protected by a multilevel password security system to prevent unauthorized access.

In addition to processing claims, ACPS is said to provide a real-time data base showing where benefit dollars are going. It can also compile a series of management reports.

ACPS runs on Hewlett-Packard Co. 3000 computers. It costs $150,000.

Synergy Health Systems, #201, 16775 Addison, Dallas, Texas 75248.

Applications packages

Group 1 Software, Inc. has announced **software for plant loading**.

The software is said to allow a mailer to bypass local bulk-mail centers. Mail will be transported by the U.S. Postal Service to a sectional center facility, auxiliary sectional facility or destination bulk center, depending on mail qualifications. The software analyzes and qualifies a mail file to plan for the most optimal postal delivery destinations. Truck codes are assigned to each qualifying mail piece.

The software, which runs on IBM mainframes and compatibles, is priced at $12,500.

Group 1 Software, 5185 MacArthur Blvd. N.W., Washington, D.C. 20016.

Cozzi Research has announced **Partner**, a software product for the IBM System/38 said to provide pop-up windows as the user interface.

Partner is said to provide office accessories such as a calendar, appointment calendar, notepad, full-function calculator, personal file address book, group jobs window and pop-up context sensitive Help.

It runs in the background and, according to the vendor, it can be customized on a global or user basis.

Partner is priced at $895.

Cozzi Research, Suite 304, Building E, 800 Roosevelt Road, Glen Ellyn, Ill. 60137.

Languages

Thoroughbred Software has announced a porting of its **Thoroughbred Basic** to both the Fortune Systems Corp. 32:16 and 68020 Fortune Formula Unix-based computer systems.

Four versions of the product were announced: a port to the Formula machine under For:Pro, Fortune's version of the Unix operating system; a port to the Formula machine under Unix; a port to the 32:16 under For:Pro; and a port to the 32:16 under Unix.

Prices range from $895 to $2,495, depending on the number of system users.

Thoroughbred Software, P.O. Box 1035, 102 Old Camplain Road, Somerville, N.J. 08876.

Utilities

Sterling Software, Inc.'a Dylakor Division has announced an optional feature for its **Dyl-Interface DB2** data management system.

The optional feature is said to allow users to change information within DB2 files. Dyl-Interface DB2 is said to transparently link IBM'a DB2 relational data base with Dylakor's information management systems Dyl-270, Dyl-280 and Dyl-280 II. It supports the complete relational structured query language syntax, the vendor said.

The product runs under MVS and MVS/XA under IBM'a TSO. It operates on IBM 370, 3000 and 4300 series mainframes and plug compatibles.

The full version of the product is priced at $8,690. The retrieval-only version costs $6,380.

Sterling Software'a Dylakor Division, P.O. Box 2210, Chatsworth, Calif. 91313.

Oak Software has announced **Procedure X**, a software space-manager tool designed to manage files, libraries and folders on the IBM System/36 or 34 disk.

Procedure X automatically analyzes the files, libraries and folders. It ensures that nothing takes up more room on the disk than necessary.

The Procedure X tool is priced at $99.

Oak Software, 2nd Floor, 435 N. Gulf Blvd., Indian Rocks Beach, Fla. 33535.

Adventureware, Inc. has announced **4th Write**, an automated documentation and maintenance tool for use with Focus, the fourth-generation language from Information Builders, Inc.

According to the vendor, 4th Write produces hard copy by stripping essential data from the user's Focus Masters and Focexecs, including optional comments from the source code. It then creates a Focus data base. Documentation reports are produced from the data base.

4th Write is available for CMS environments. It costs $6,000.

Adventureware, 3434 Huntertown Road, Allison Park, Pa. 15101.

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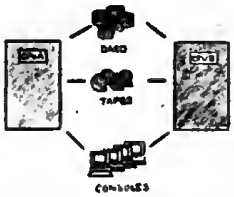

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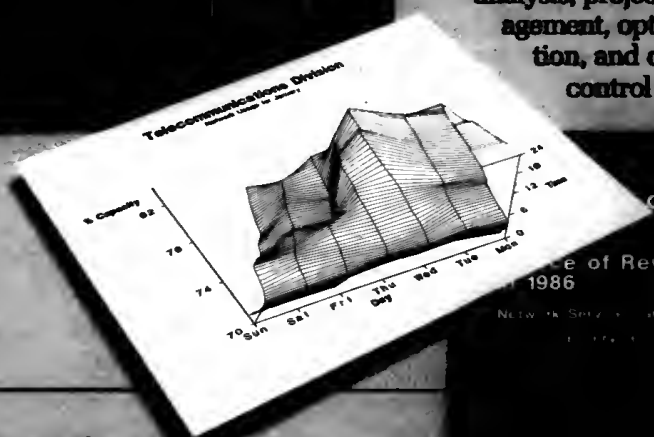

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MICROCOMPUTING

SMALL TALK

William Zachmann

Toshiba heats portable pot

The market for truly portable personal computers is a pot that is now starting to boil, and one type of machine is getting especially hot.

There are currently four generic classes of portables, including those with small CRT screens that long dominated the high end of the market. At the low end, there are the limited-display, diskless products such as the Tandy Corp. Model 100. In between, increasingly capable battery-operated floppy disk-based systems have sparked faster market growth.

But perhaps the hottest category consists of IBM Personal Computer AT-compatible hard-disk systems with flat panel displays relying on external power supplies. The Toshiba America, Inc. 3100 is already a winner in this category. Its list price recently reduced to $4,199, the 3100 delivers a reliable, solid value in a 15-lb, brief case-size package.

The basic system is built around an 8-MHz Intel Corp. 80286-2 microprocessor. It comes with 640K bytes of ran-

Continued on page 34

Voice system's worth debated

BY ALAN J. RYAN
CW STAFF

YORKTOWN HEIGHTS, N.Y. — IBM scientists recently demonstrated the company's experimental, 20,000-word vocabulary speech-recognition system, but analysts were divided on the usefulness of such a product.

Less than a year ago, IBM demonstrated its Personal Computer-based, 5,000-word experimental system [CW, April 21, 1986]. Prior to that, a room filled with computer equipment was required for the 5,000-word system.

The latest desktop system includes 97% of all the words a speaker is likely to use in business, the vendor said. The product's overall accuracy rate, which includes words not listed in the 20,000-word vocabulary, is approximately 95%, which translates into one mistake for every 20 words, according to the vendor.

Accuracy "is still a very active area of research" for this product, an IBM spokesman said. He added that the accuracy rate would be higher for words listed in the system's vocabulary.

The system, which will be tested in IBM offices, works when words are uttered into a microphone with a brief pause between each word. Shortly after the word is spoken, it appears on the computer screen, the vendor claimed.

According to William Zachmann, vice-president of corporate research at International Data Corp. (IDC), a Framingham, Mass.-based research firm, most people would like to have a computer that takes dictation. But, to do that, "you would really need continuous voice recognition. To say one word at a time is a very inconvenient way of doing that," he said.

"It's an impressive leap forward for that whole industry," said Charles Newton, president of Newton-Evans Research Co. in Ellicott City, Md. He said the technology, developed at IBM's T. J. Watson Research Center, would be useful for "highly trained operators and dispatchers, a major part of whose function is data entry.

"I think, for handicapped workers or for work where you need hands free," the system would be a boon, Newton said. He added that the system could be ideal for inventory control.

Because it is speaker-dependent, the system requires a preliminary 20-minute session in which the user trains the computer by reading a document. The information collected is used to characterize 200 sound patterns in the user's voice.

Words spoken are matched against a data base of 25 million words in collections of phrases commonly used in office correspondence. The number of word candidates is reduced by determining which words are most likely to follow the two previous words in business usage.

IBM said the unit's contextual ability enables it to distinguish between words that sound alike but are different, such as "know" and "no" or "to," "two" and "too." Punctuation can be added verbally or manually.

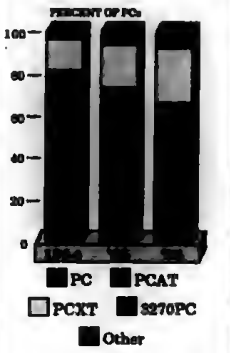
The system is based on the IBM PC and uses two high-speed subsystems, each containing a digital signal-processor chip. The first subsystem transforms a speaker's words into a string of labels, which encodes the speech. The second matches those code labels against labels of words in the system's vocabulary.

"It still has the problem of being slow and cumbersome," IDC's Zachmann said. The technology is very unlikely to have an effect on the industry until continuous voice recognition is realized, he added.

Data View

IBM Personal Computers

Distribution of models installed from 1984 to 1986



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CW CHART MITCHELL J. HAYES

Macintosh makes an end run

BY PETER BARTOLIK
CW STAFF

COMMENTARY

It seems that the Apple Computer, Inc. Macintosh line has suddenly sparked the creation of a new cult of believers among the third-party microcomputer products community. A host of vendors are sprouting products to be used on "the computer for the rest of us," as one of the many heralded ad campaigns used to say.

Even Lotus Development Corp. readied a "new" package — the more cynical in the industry would call it a revamped Jazz — for the new breed of Macintosh.

The user community, once urged to disregard Apple's unique system as little more than a toy, is now faced with a barrage of industry hype that the Macintosh offers true business solutions. "Have I missed something?" the corporate buyer asks himself.

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Inside

- CD-ROM users reveal applications goals. Page 32.
- Phoenix Technologies releases tool to enhance MS-DOS performance. Page 32.
- Zenith reduces portable desktop PC prices. Page 35.

Hockey team crosses line with micros

Chicago Black Hawks ice Ticketron, choose PCs to automate ticket sales

BY DOUGLAS BARNEY
CW STAFF

CHICAGO — The Chicago Black Hawks hockey team is scoring big with microcomputers that automate season ticket sales.

For years, the Black Hawks used the Ticketron 2000 and 2001 systems to manage ticket sales and print tickets. But the Control Data Corp. Cyber 18-based system cost $40,000 a year to lease. In addition, the system did not provide enough flexibility, a penalty the Hawks could not afford to take.

"I didn't want to live within the limitations that somebody else has set," said John Stroth, ticket manager for Chicago Stadium Corp.

At first, Stroth took a shot at developing his own personal computer-based ticketing system using Ashton-Tate's Dbase II. He said he soon realized that he did not have the time to complete the task and contacted a third party to write the application in Ryan-McFarland Corp.'s RM Cobol.

Some $30,000 later, the software was installed on a system that uses an IBM Personal Computer AT as a file server and another AT and five IBM PCs as nodes. The machines are linked with a local-area network running Novell, Inc.'s Advanced Netware software.

Although the total cost of the current system was more than $40,000, Stroth said he expects a substantial savings over the Ticketron system. "By the time you talk two years, we are way ahead of the game," Stroth said.

Besides the cost savings, the Black Hawks needed a robust system to handle the growth in season ticket sales. "The Hawks got very hot, and the business went from 4,000 or 5,000 season tickets to 14,000 out of 17,000 possible seats."

In addition to the custom package, the Black Hawks went back to a professional printer and arranged to have the printers made computer-compatible with the Black Hawks' machine. "We generate a tape that we send to the ticket printer that tells him which tickets to print," Stroth explained. The custom system includes many features specified by Stroth, which include detailed seating charts that enable customers to see the placement of their seats. But Stroth will not stop there.

THE Black Hawks needed a robust system to handle the growth in season ticket sales.

"What I envision for the future — when laser disks get cheap enough and we have the time to invest in taking the pictures — is to be able to call up a picture of the arena from any seat," Stroth said. This capability, though possible with existing technology, is probably a few years away because of the current high costs of laser storage and image processing technology, he explained.

Also on tap is the ability for the ticket office to communicate directly with a PC at the stadium. "We just acquired a couple of modems and will put a PC at the arena itself with a modem. Then I can dial up this network and get information. For example, if somebody lost their ticket, I can pinpoint their seat location," Stroth said.

Users planning for CD-ROM applications

BY PEGGY WATT
CW STAFF

SEATTLE — Potential users of compact disk/read-only memory (CD-ROM) technology interviewed at a recent Microsoft Corp. seminar had clear applications goals in mind for the new technology.

A representative of the U.S. Bureau of the Census said the staff hopes to implement CD-ROM technology to distribute results of the 1990 census. "Our uses are perfect for CD-ROM. It may finally bring the paperless office," said James Clark, technical director at the census office in Washington, D.C. He said the department is currently testing CD-ROM versions of several data bases.

Also testing CD-ROM technology is Nynex Corp.'s Information Resources division, which is using it to store directories of frequent callers, as well as for its own access by operators, said Douglas Cummings, manager of business development.

CD players are already in place in most of the 22 libraries in the Columbia University system in New York, according to Lilita Gusts, business library director. She said she was looking for on-line references and upcoming technology. "The resources that will be the biggest hits in the library are the ones that have the actual information on the disk," she said. "Then you can download it and walk away. Who wants to download citations, then go back and look up the sources?"

In addition to users, many of the 1,100 attendees were developers checking the progress and potential of optical media. "We're here kicking tires," said Mike Acheson, optical media project manager and one of several Apple Computer, Inc. employees who led seminars.

Those early users and their choices of applications will help set CD-ROM design standards, said Tom Clarkson, chairman of Graphics Software Systems, Inc. in Beaverton, Ore. "The way CD-ROM is used will determine the software interface," he said. But each pioneer developer seems to design a unique search-and-retrieve method in an industry where standards have been debated from the beginning.

Diverse interfaces are appropriate when they are designed for different audiences, said optical storage industry analyst John Gale, president of Information Workstation Group in Alexandria, Va. "You want the search engine to be appropriate to the type of data you have," he said.

Users will finally set the standards, said Robert Carr, chief scientist at Ashton-Tate. "Mike MIS isn't going to retrain 5,000 corporate users on a new querying front end that's different from the one they already use. He just won't buy the product and will get the reference data elsewhere," Carr said.

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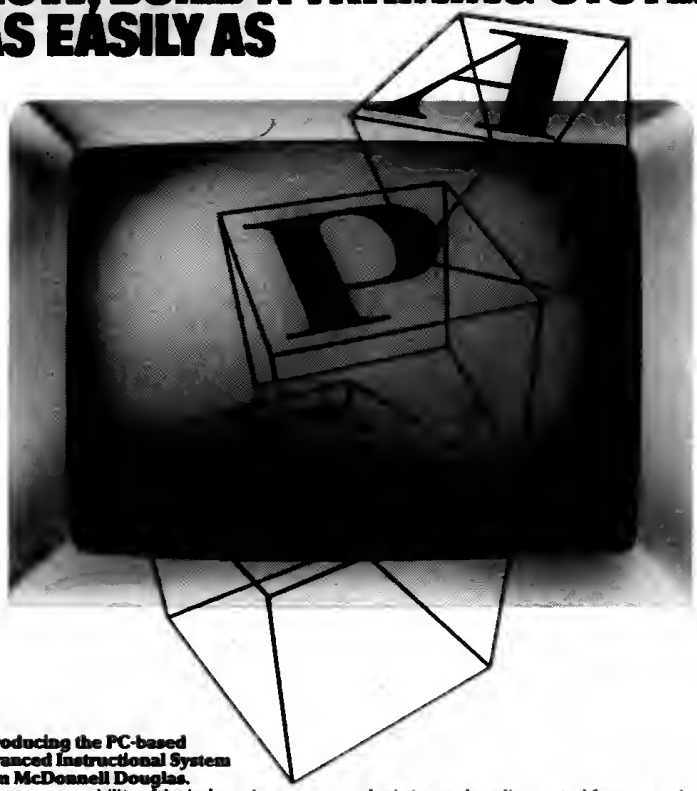

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Aid ups MS-DOS power on 80386

BY DAVID BRIGHT
CW STAFF

NORWOOD, Mass. — A systems software product that reportedly optimizes the performance of existing Microsoft Corp. MS-DOS applications on Intel Corp. 80386-based machines was recently introduced by Phoenix Technologies Ltd. The tool is slated to be sold to systems manufacturers starting this month.

Called Control/386, the software is said to boost the performance of applications running on an 80386-based system, increase a system's compatibility with Intel 8088- and 80286-based machines and add new features to an 80386-based machine.

Regardless of any new operating systems that may be introduced, MS-DOS 3.X is going to be around for a long time, pointed out Jonathan Joseph, product line manager for compatibility software for Phoenix. Control/386 was designed with that reality in mind.

"We see that there is a real need for a product that addresses 386 hardware as it can be built now and operating systems that are available now," he said. He added that the program is not a replacement to MS-DOS, and that the performance increases will vary according to the type of application.

System performance is increased through 32-bit emulation of both the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) and the Enhanced EMS, the company said. In addition, the program is said to improve the performance of disk-intensive applications by allocating some of a machine's 32-bit memory for caching. The performance of a machine's IBM BIOS and IBM Enhanced Graphics Adapter performance is also increased, according to Phoenix.

The program enables users to run timing-dependent, copy-protected applications on an 80386-based machine, the vendor said. Joseph said he expects 80386-based machines using Control/386 to be introduced at Comdex/Spring '87 in June.

PC data base targets ease-of-use buyers

BY DOUGLAS BARNEY
CW STAFF

DENVER — An icon-based, menu-driven data base package from Precision Software Ltd., slated to be announced later this month, is part of the large crowd of products aimed at IBM Personal Computer and compatible users interested in an easy-to-use data base.

Superbase Personal achieves its ease of use by running under graphics environment manager (GEM), a graphics-based operating envisonment from Digital Research, Inc., Precision Software claimed. Along the bottom of the screen, Superbase displays icons similiar to the buttons on a videocassette recorder. With these icons, the user can scroll through data and pause, fast-forward or rewind.

'Entry-level system with power'

"It is an entry-level system with all the power of the top-line data bases but without the complexity," John Tramner, Precision Software managing director, said. Progressive Peripherals & Software, Inc., located here, is expected to distribute the product in the U.S.

File and record capacities are limited by the amount of disk storage a user has, the firm said. In addition, the number of open files and fields per record are limited by the user's system configuration.

The package can also import, store and retrieve images and graphics from other applications, including Digital Research's GEM Draw. According to Tramner, this capability will allow users to build a picture data base.

By fall, the firm said it expects to announce Superbase Professional, a package that includes a programming language and is aimed at the more sophisticated user. The Professional version will also include limited word processing capability and form letter and multifile form-generation capabilities, Precision Software said.

The programming language is essentially a simplified version of Basic with added commands specific to data base operations, Tramner said. Additional functions built in to the language include optional line numbers and procedure labels.

Superbase Personal is slated to sell for $150 with the GEM operating environment and for $100 without GEM. The package runs on IBM PCs and compatibles and requires GEM and a mouse. Superbase Personal users will be able to upgrade to Superbase Professional at a reduced price, although the price of Superbase Professional has not been set.

Macintosh

CONTINUED FROM PAGE 31

The answer is no. Despite Apple's final accommodation to some third-party tinkering within the confines of its machines, there has been no technological breakthrough. Rather, the breakthrough has come with the realization that dependance on the Microsoft Corp. MS-DOS standard has created what Wall Street analysts term "exposure." Having committed themselves to live under the umbrella of Microsoft and IBM, third-party software and add-on vendors now face at least a year of dismal growth prospects waiting for the industry's leading partners to get their act together.

With Microsoft's continual delays of an MS-DOS for Intel Corp. 80286 microprocessors, there is little new opportunity in the IBM-compatible arena. While tool kits for the advanced MS-DOS may be delivered in six months, they will include only an unfinished version of the operating system. Bringing out new products based on that operating system will take at least a year and will be hampered by the need to adjust to Microsoft's revisions.

The dreaded FUD factor

Then there is the oft-proclaimed FUD factor. There is such fear, uncertainty and doubt about IBM's intentions that third-party developers are starting to wonder if things will be so easy in future. As clones cut into IBM at the low-end, common sense dictates that IBM will turn some little tricks to make its Personal Computers unique, adding value with certain communications and graphics functions built-in that clone makers cannot easily duplicate. That raises the prospect that third-party developers will have to craft two versions of their products: one for the IBM family and the other for clones.

With a delay of at least a year before the next MS-DOS becomes commercially viable, and faced with the prospect of dealing with an unaccommodating IBM, former devotees of one industry standard need to hedge their bets. They need continued growth in the coming year and protection from the whims of IBM.

So there is Apple. Slowly, Apple has sold a reported one million Macintosh units, though of varying models, and has gained inroads into America's corporations, albeit mainly in ones and twos. But the machines are out there, and gaining a piece of that one-million-and-growing market makes a lot more sense than sitting on one's hands waiting for Microsoft to deliver and IBM to show its colors.

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Toshiba

CONTINUED FROM PAGE 31

dom-access memory, which can be expanded up to 2.6M bytes. A 10M-byte internal hard disk and a single 720K-byte 3½-in. hard-shell floppy disk drive are also included. The display is a crisp gas-plasma screen with 640- by 400-pixel monochrome graphics and standard 25 by 80 text capabilities.

Serial and parallel ports, as well as a built-in red-green-blue adapter offering IBM Color Graphics Adapter (CGA) compatibility are standard features. Connectors are also provided for an external disk drive and an expansion chassis using the standard 8-bit IBM PC XT bus.

The nicely designed 81-key keyboard packs full-size sculptured keys with all the standard functionality of the original PC AT keyboard in a 12.2- by 3.1- by 14.2-in. package. In addition to Caps Lock, Num Lock and Scroll Lock lights, the 3100 also has LED indicators for processor speed selection, external CRT selection and disk-in-use lights.

Switchable displays

Keystroke combinations let the user switch between the built-in gas plasma display and an external color display as well as between processor speeds. Optional accessories include an external 5¼-in. floppy disk drive, a 2M-byte memory card, an expansion unit with five PC XT-compatible slots and an internal Hayes Microcomputer Products, Inc.-compatible 1,200 bit/sec. modem.

Copies of Borland International's Superkey and Sidekick on 3½-in. disks are also bundled with the system. Microsoft Corp.'s MS-DOS is included as well.

An additional MS-DOS command, Chad, is useful in maximizing software compatibility with the 3100's gas-plasma display. Installed as a memory-resident utility when first invoked, Chad is subsequently called up by pressing the Sys Req key.

This step brings up a text window on the screen that indicates the way that color foreground or background character formats are being shown on the gas-plasma monochrome display. Color character on color background and color character on black background may be displayed as normal, reverse, intensified normal or intensified reverse characters on the gas-plasma display.

With the appropriate selection from among these options, most software written for the IBM CGA can work on the 3100's gas-plasma monochrome display. In graphics mode, the CGA three-color palette with 640 by 200 pixel resolution is represented on the 3100's plasma display by three different intensity, or orange scale, levels. Software with appropriate drivers can use the increased resolution of the 640- by 400-pixel monochrome graphics mode.

Like other hard-disk portables, the 3100 requires an external power supply, so it cannot be used on an airplane.

Powerful enough to support serious work, the 3100 can also be used to build real applications, for example for traveling sales and service personnel. With the optional built-in modem, the 3100 provides a platform around which an organization could build a sophisticated system for handling things like order entry, credit checking and call reporting. With data base and spreadsheet software, the 3100 could also be a useful and powerful tool for off-site contract negotiations, accounting audits and similar applications.

Recently, even more powerful portable systems have been announced by other vendors. Compared with the premium prices they carry, however, the Toshiba 3100 starts to look like a real bargain. The 3100's capabilities will be more than enough for most users.

The Toshiba 3100 offers yet another testimony to the benefits users can reap from the intense competition among vendors vying to offer more value within what has become an industry-standard architecture.

Zachmann is vice-president of research at International Data Corp.

Tool ups Mac printing quality

READING, Mass. — A software package said to bring professional quality typesetting to the Apple Computer, Inc. Macintosh was announced by Addison-Wesley Publishing Co.

Called Textures, the $495 package is based on the Tex typesetting language, a computerized typesetting and controlled page-layout industry standard with more than 250,000 users, according to Addison-Wesley officials.

Addison-Wesley is not positioning Textures as a desktop publishing package. Rather, it is designed for the typesetting of long, structured documents numbering thousands of pages, such as scientific papers with mathematic formulas and scientific notation, said Henry Suwinsky, software marketing manager.

The package is very sophisticated, according to Suwinsky, and is not particularly easy to use. "It is not like Aldus Corp.'s Pagemaker, for example, which you can learn in a very short period of time. What is unique about the product is that it will take an entire document and optimize the eotire document as a whole."

A hard disk drive is recommended for Textures. Addison-Wesley said it expects to begin shipping the package in May.

"We picked Word not fancy formatting, but and easy training are there's very little

Mike Macewich, Senior Decision Support Consultant, The Quaker Oats Company.

The biggest expense in corporate computing isn't the hardware and it isn't the software. It's the training. So when Quaker went looking for word processing, their wish list was uncompromising.

It had to be so easy, no manager would want to manage without it. So sophisticated, even a secretary couldn't find a missing feature. So adept, it would make everyday memos look like they came out of a printshop. So simple to learn, people would be up and producing the very first day.

It had to show on screen what you'd get on the printed page. It had to have comprehensive training on the disk and at your fingertips. And outline processing built right in.

It had to generate indexes or tables of contents. Convert files from other word processors to its own. Get its money's worth out of sophisticated laser printers. And be able to connect smoothly with any of the major network systems.

Microsoft® Word. If [illegible] puts words on paper to make a [illegible] proposal, [illegible] a mouse, you [illegible] Quaker did.

NEW PRODUCTS

Systems

Zenith Data Systems has reduced the prices of four of its **portable desktop personal computers.**

The dual-drive Z-148 PC is now priced at $1,299. The 20M-byte hard-disk version now costs $1,899. The Z-148 series features 256K bytes of random-access memory (RAM) and switchable operating speeds of 4.77 and 8 MHz.

The 40M-byte hard-disk version of the IBM Personal Computer-compatible Z-248 PC featuring 512K bytes of RAM, an IBM Enhanced Graphics Adapter video card and an 8-MHz clock speed, now costs $4,999. The Z-171 portable PC now costs $1,999. It features a 9-in. diagonal screen and two 5¼-in. floppy disk drives.

Zenith, 1000 Milwaukee Ave., Glenview, Ill. 60025.

Wyse Technology has dropped the price of the 40M-byte **Wysepc 286.**

The Wysepc 286 features a 10-MHz processor, a 6-MHz compatibility mode, a range of display options and compatibility with the IBM Personal Computer AT. It includes 640K bytes of random-access memory, eight full-size expansion slots, a real-time clock calendar with battery backup and an RS-232 serial and parallel port.

The Wysepc 286 is now priced at $3,699.

Wyse Technology, 3571 N. First St., San Jose, Calif. 95134.

Software applications packages

MCBA, Inc. has ported its **accounting, distribution and manufacturing software** to the Santa Cruz Operation (SCO) Xenix System V operating system.

The packages available are Accounts Payable, Accounts Receivable, Bill of Material Processor, Customer Order Processing, General Ledger, Inventory Management, Master Scheduling, Material Requirements Planning, Purchase Order and Receiving, Payroll and Report Writer.

The prices for the software under SCO Xenix System V range from $1,000 to $7,000 for source-code licenses, the vendor said.

MCBA, 425 W. Broadway, Glendale, Calif. 91204.

Action Instruments, Inc. has announced **Version 3.0** of its **IC-DOS**, a Unix-compatible, real-time multitasking operating system.

IC-DOS features the ability to run 48 concurrent tasks on one personal computer; a real-time scheduler; capability for distributed filing for networking and distributed processing; and the ability to transfer information between windows.

The system can be installed along with Microsoft Corp. MS-DOS on a hard disk. IC-DOS contains utilities for sharing information with MS-DOS.

IC-DOS costs $695.

Action Instruments, 8601 Aero Drive, San Diego, Calif. 92123.

The MacNeal-Schwendler Corp. has introduced **MSC/Pal for the Macintosh**, an engineering analysis package for Apple Computer, Inc.'s Macintosh.

MSC/Pal is said to perform static and dynamic finite-element analysis. It uses pull-down menus and dialogue boxes. The program's element library includes beams, quadrilateral and triangular plates and plane-stress and plane-strain membranes. Another feature is interactive graphics capabilities.

MSC/Pal for the 512K-byte Macintosh costs $995. For machines with 1M byte of memory, it costs $1,495.

MacNeal-Schwendler, 815 Colorado Blvd., Los Angeles, Calif. 90041.

Sterling Castle Software has introduced **PC Manager**, a random-access memory-resident software program.

PC Manager is said to initiate feedback on managerial performance and remind the user of appointments, goals and things to do while other programs are running. The frequency of the Remind feature can be adjusted by the user, according to the vendor.

Other features include a calendar screen, a goal screen, a password-protected information and people screen and a notes screen. Also included is a calculator.

PC Manager is priced at $99. It runs on IBM Personal Computers.

Sterling Castle, Suite 174, 702 Washington St., Marina Del Rey, Calif. 90292.

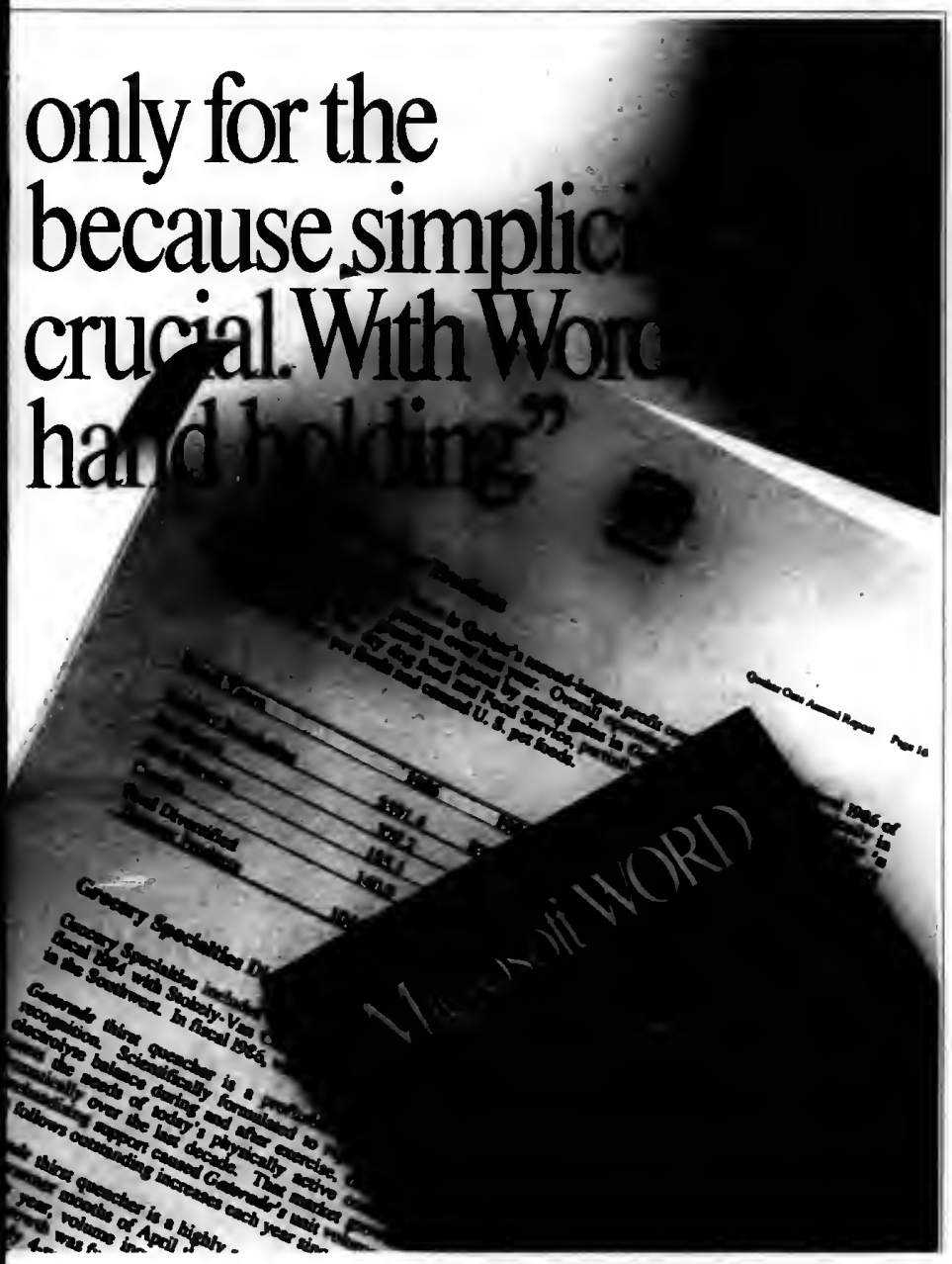
Ryerson Polytechnical Institute has announced **Sumquest**, software for IBM Personal Computers and compatibles.

Sumquest is said to allows users to conduct in-house surveys for marketing research. Users can design the questionnaire, collect responses and analyze the output.

The software comes with a survey guidebook that describes types of questions to ask, when to use phone, mail or personal interviews, whom to survey, how many people to survey and how to analyze output.

Sumquest costs $695.

Ryerson Polytechnical Institute, 350 Victoria St., Toronto, Ont., Canada, M5B 2K3.



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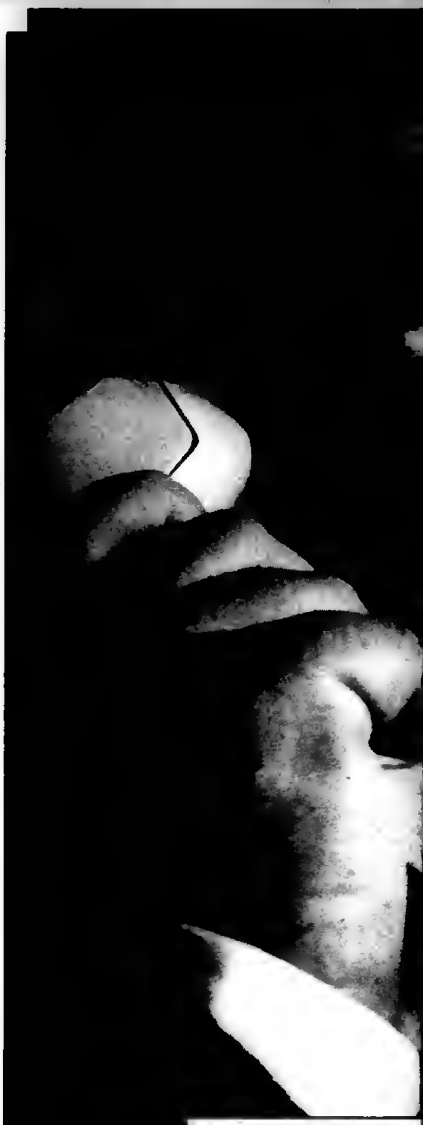

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Software languages

Generale de Services Informatiques (GSI) has announced its **GSI Pascal Debugger** for the IBM Personal Computer and compatibles.

The GSI Pascal Debugger is composed of a turbo-compatible compiler written in Borland International's Turbo-Pascal and a source debugger written in Pascal and assembler language. The compiler generates a P-Code with symbol and address tables that the debugger uses to process a program.

Features include a full-screen editor, built-in Help screen, calculator, file manager and windows. Capabilities include displaying program source during execution, a tracing option with automatic stop, assignment and display of local and global variables and constants and display of tree structures.

The GSI Pascal Debugger is priced at $49.95.

Generale de Services Informatiques, 1380 Old Freeport Road, Pittsburgh, Pa. 15238.

Software utilities

Insyte Development has announced **1-Tools-3**, a package of utilities programs designed for use with work sheets.

The package includes a menu maker program that allows the user to generate custom access menus to work sheet programs and all other utility programs; a file manager program that includes support for subdirectories; a preview report generator designed to allow users to preview a page in what-you-see-is-what-you-get graphical format on the screen before outputting to the printer; and a form maker companion product to the preview report generator that allows the user to generate custom forms.

1-Tools-3 costs $69.95.

Insyte Development, Suite 137, 9842 Hilbert St., San Diego, Calif. 92131.

Lattice, Inc. has announced its **Lattice Dbc III Plus** library of C functions.

The network-ready, multiuser package is said to enable C programmers to simultaneously create, access and update files that are compatible with Ashton-Tate's Dbase III Plus.

The library allows C programmers to replace Dbase III Plus operations with C language programs, the vendor said.

Functions are said to allow a file or record to be locked automatically or manually and to test whether a file or record is locked or free. They also reportedly prevent accidentally locking a file or record that is already locked.

Lattice Dbc III Plus costs $750.

Lattice, P.O. Box 3072, Glen Ellyn, Ill. 60138.

Software enhancements

Data Access Corp. has enhanced its **Dataflex** applications development data base to include an automated utility called Db-Read.

Db-Read is said to transfer data from Ashton-Tate's Dbase II, III and III Plus .DBF files into Dataflex .DAT files. The program can read a submitted data file, determine which .DBF format the data is stored in, create an equivalent Dataflex entry program and move the data into a Dataflex format file. The resulting entry program is multiuser in all supported environments, regardless of whether the original Dbase program was or not, according to the vendor.

A Dataflex development license is priced from $750 for an 8-bit, single-user system to $1,250 for a 16-bit, multiuser system.

Data Access, 8525 S.W. 129th Terr., Miami, Fla. 33156.

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Rapid System Developmnt. 211 W. 56th Street, 36H7 New York NY 10019-4323

One of the most significant developments in IBM ASCII terminals is the one you may never use.

Macropac International has unveiled an enhanced version of its **101 Macros for Lotus 1-2-3.**

The new version is said to provide all 101 macros written in both the 1A language and separately in the 2.0 and 2.01 languages of Lotus Development Corp.'s 1-2-3.

Among the macros included are a word processing macro that adds word wrap to 1-2-3, a macro to create graphics slide shows and a pop-up notepad, calendar and calculator with scientific functions and memory. Additional macros allow users to insert page breaks, switch the default to an alternate drive, toggle between the macro area and the spreadsheet, hide rows for printout and display any date as the day of the week, month, day and year.

The program is priced at $69.95.

Macropac International, Suite 168, 19855 Stevens Creek Blvd., Cupertino, Calif. 95014.

Jandel Scientific, Inc. has announced **Sigma-Plot Version 3.0**, an enhanced version of its scientific graphing program for Microsoft Corp. MS-DOS-based personal computers.

The software was designed to produce scientific data plots. It can produce scatterplots, line graphs, bar charts and histograms. Features of Version 3.0 include polynomial curve fitting, cubic spline interpolation, Greek alphabet, mathematical symbols and advanced page composition features.

Sigma-Plot Version 3.0 accepts keyboard input, DIF files and most ASCII files. It supports Hewlett-Packard Co. and other pen plotters as well as the HP Laserjet+.

Sigma-Plot Version 3.0 costs $350.

Jandel Scientific, 2656 Bridgeway, Sausalito, Calif. 94965.

DPX, Inc. has announced a multiuser version of its **Rode/PC** data entry system.

The Rode/PC multiuser version is said to allow users to replace key-to-disk minicomputers with networked personal computers. The product combines the stand-alone processing power of personal computers and the communications capabilities of local-area networks to provide functions of traditional minicomputer-based data entry systems.

The multiuser version of Rode/PC requires a PC network compatible with IBM's Netbios standard such as the IBM Token-Ring network.

The cost for five workstations is $3,250.

DPX, 20823 Stevens Creek Blvd., Cupertino, Calif. 95014.

Laboratory Technologies Corp. has announced **Version 4.0** of its **Labtech Notebook**, a personal computer-based data acquisition package.

Labtech Notebook now supports a variety of mathematical, statistical and signal processing functions including real-time Fast Fourier Transforms and FIR filters.

Other new features include intelligent data collection with pretriggering and the ability to trigger using analog values compared against thresholds.

A replay channel has been added to the software making it possible to acquire data from the disk file in real-time at the same time data is being acquired from the instrumentation.

Labtech Notebook is priced at $895.

Laboratory Technologies, 255 Ballardvale St., Wilmington, Mass. 01887.

Data storage

DS Technologies, Inc. has announced **DS Backup+**, hard-disk backup for personal computers with virtual links to mainframes.

Continued on page 40

Announcing an IBM first: the three-year ASCII terminal warranty.

Here's how it works.

Should you have a problem with any of the three elements* of an IBM ASCII terminal purchased after June 15, 1986, just take the problem element to any IBM Service Exchange Center or IBM authorized remarketer.

They'll exchange the non-working element for one that works. So you'll be on your way with a minimum of downtime.

How will you know which element isn't working properly? Our built-in diagnostics let you know quickly.

Of course, all this may well be academic. For given the reliability that's built into every IBM ASCII terminal, the three-year limited warranty is one feature you'll probably never need.

IBM's unique plug-in emulation cartridges.

Emulation	3161	3162	3163	3164
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Lear Siegler ADM-3A	X	X		
Lear Siegler ADM-5	X	X		
TeleVideo 910, 910+, 912, 920, 925, 925E	X	X		
TeleVideo 950			X	
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Introducing the 132-column IBM 3162.

But our three year warranty isn't the only significant development in IBM ASCII terminals.

There's our new full-function 3162.

It features a crisp, clear, readable 9 x 15 character cell.**

And it's available with our new amber-gold 14-inch screen. Or our new green 14-inch screen. Your choice.

What's more, not only is the IBM 3162 switchable between 132 and 80 columns, it shows 28 rows of data. Which enables it to display even more information.

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DS Backup+ is said to back up and restore single files or directories, multiple directories or entire hard disk drives. According to the vendor, the product can back up any DOS device, including Bernoulli boxes.

Features include data compression, directory and file scrolling and critical safety.

Compatible host systems with virtual links include IBM 4300 series, 3080 series and System/36 and 38.

Other compatible host systems include those from Digital Equipment Corp., Hewlett-Packard Co., Data General Corp. and Texas Instruments, Inc.

DS Backup+ costs $79.95.

DS Technologies, 1275 West Roosevelt Road, W. Chicago, Ill. 60185.

Printers/Plotters/Peripherals

Televideo Systems, Inc. has announced the **Televideo PC Station**, an alternative to personal computers for workstations on multiuser systems.

The PC station is said to offer personal computer-compatible screens and keyboards. It is also compatible with the vendor's 925/905 terminal with both 80- and 132-col. displays.

Features include an IBM Personal Computer AT-style keyboard, a 14-in. monitor and PC-compatible parallel and RS-232C serial ports. The PC Station is also said to offer simultaneous, key-selectable, dual-host capability with the flexibility to handle 80-col. micro applications and 132-col. mainframe applications through its ASCII code compatibility.

The Televideo PC Station costs $629.

Televideo Systems, P.O. Box 3568, 1170 Morse Ave., Sunnyvale, Calif. 94088.

Toshiba America, Inc. has introduced the **P351C Model 2**, an enhanced version of its 3-in-One printer.

The 24-pin color printer is said to print at 300 char./sec. in draft mode and 250 char./sec. in the condensed printing mode. Letter-quality mode print speed is 100 char./sec. Other features include a bottom-feed provision; Qume Sprint 11, IBM Graphics Printer and IBM Color Printer emulations; three resident type fonts; and the capability to accept a variety of type fonts from optional disks or cartridges.

The P351C Model 2 is priced at $1,749.

Toshiba America, 2441 Michelle Drive, Tustin, Calif. 92680.

Electrohome Ltd. has announced the **ECM 1900** family of 19-in. Variscan color monitors.

All monitors in the ECM 1900 family feature automatic horizontal- and vertical-frequency adjustments, allowing the monitor to interface to a personal computer using a variety of add-on color cards and software.

The monitors provide a noninterlaced resolution of 1,024 by 512 pixels and an interlace resolution of 1,024 by 800 pixels. The red-green-blue monitors accept both TTL and analog inputs.

The ECM 1900 monitors cost $3,195 each.

Electrohome, 809 Wellington St. N., Kitchener, Ont., Canada N2G 4J6.

Board-level devices

Ahead Systems, Inc. has announced **EGA2001**, an automatic mode switching universal enhanced graphics adapter (EGA) card.

The card is said to feature 640- by 480-pixel resolution. It is compatible with the IBM EGA, the IBM Color Graphics Adapter, the IBM Monochrome Display Adapter and the Hercules Computer Technology, Inc. Graphics Card.

The EGA2001 can also run Hercules programs on EGA and Multisync monitors. It can dislay 132-col. text by 25 or 44 rows on monochrome, EGA and Multisync monitors for Digital Equipment Corp. VT100 terminal emulation, word processing and spreadsheet programs.

The EGA2001 is priced at $369.

Ahead Systems, Suite B105, 1977 O'Toole Ave., San Jose, Calif. 95131.

Monolithic Systems Corp. has introduced **Justram**, a memory expansion module for the IBM Personal Computer AT.

Justram is said to provide up to 8M bytes of additional memory in a single slot. The board meets the Lotus/Intel/Microsoft Expanded Memory Specification and may be used as conventional, expanded or extended memory. It operates at 12 MHz with wait states or 8 MHz with zero-wait states.

The full 8M-byte memory module consists of a motberboard with 4M bytes and a mezzanine random-access memory-array board with the second 4M bytes.

The 8M-byte module costs $2,690.

Monolithic Systems, 84 Inverness Circle E., Englewood, Colo. 80112.

A-O Electronics, Inc. has introduced **X-Lock 50**, a personal computer security system said to prohibit unauthorized computer use.

The X-Lock 50 consists of an internal half-card and a software diskette. In addition to limiting access to the personal computer to approved personnel, it features data encryption using the Data Encryption Standard algorithm. The system accommodates up to 180 user accounts, each consisting of the user's name and a one- to 16-char. password.

The X-Lock 50 is priced at $275.

A-O Electronics, 2137 Flintstone Drive, Tucker, Ga. 30084.

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Elisabeth Horwitt

Co-location: everyone wins

Hats off to Mountain Bell for being the first divested Bell operating company to take the co-location plunge. The U.S. West-held operating company has agreed to let Telenet Communications Corp. relocate its Phoenix, Ariz., switching site to a nearby Mountain Bell central office.

At first glance, co-location appears to benefit the enhanced-service provider far more than the local-exchange carrier. Mountain Bell earns some cash by leasing its facilities to Telenet, but Telenet gains easier and less costly access to Mountain Bell's basic telecommunications services — and thus to the local carrier's customer base.

This is the main reason most of the regional Bell holding companies have reacted negatively to the co-location idea, according to Telenet Vice-President of Regulatory Affairs Phil Walker. He says the Federal Communications Commission has not gone far enough with Comparably Efficient Interconnection —

Continued on page 42

AT&T gets high marks

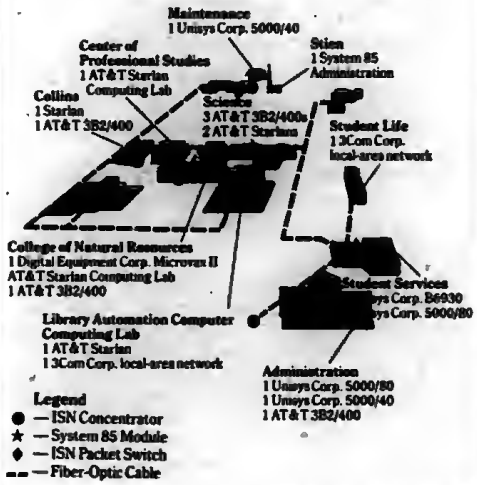
BY JEAN S. BOZMAN
CW STAFF

The University of Wisconsin — Stevens Point was one of the first organizations to use AT&T's Information Systems Network (ISN) intelligent switch as a multivendor networking tool. The University needed to connect systems that had been purchased by academic departments and administrative offices to get different jobs done. Among those who bid against AT&T were the IBM-Rolm Corp. partnership, Northern Telecom, Inc. and Wang Laboratories, Inc.'s Intecom division.

The university's MIS department needed a system that would allow students to send data from IBM Personal Computers or AT&T PCs in their dormitories to computers throughout the campus, located in central Wisconsin. This meant tying the PCs to a wide range of computer hosts, including a pair of IBM System/36s, several AT&T 3B2s, four Unisys Corp.

Continued on page 46

University of Wisconsin — Stevens Point
AT&T's ISN network links campus computers



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CW CHART: SUSAN ALDAM

Users, vendors link to seek distribution

BY NINAMARY BUBA MAGINNIS
CW STAFF

BOSTON — Large end-user companies and academic organizations have joined forces with vendors to seek distributed processing solutions. General Electric Co., Westinghouse Electric Corp. and the Software Productivity Consortium are among the charter members of the recently formed Network Computing Forum's executive committee.

Spearheaded by Chelmsford, Mass.-based Apollo Computer, Inc., the forum is chartered to work toward a distributed processing solution, according to John Robotham, the forum's managing director. The initial membership includes some 29 organizations, including computer vendors Apollo, Alliant Computer Systems Corp. and Apple Computer, Inc.; network vendor 3Com Corp.; Rockwell International Corp.; San Diego Supercomputer Center; MIT Project Athena; Texas Instruments, Inc.; and software company Oracle Corp.

The forum has extended membership invitations to several major hardware vendors, including Hewlett-Packard Co., IBM and Digital Equipment Corp. No response has been received as yet.

GE has adopted a wait-and-see attitude about the forum's potential to deliver usable distributed processing solutions, according to Herbert Most of GE's Corporation Information Technology Group. "I feel it's worthwhile for GE to be involved until we know more about what it is they're going to do," he noted.

The company will reconsider its involvement if the forum turns out to be duplicating the efforts of standards bodies or other user-and-vendor consortiums, he added.

The forum could potentially address the needs of companies like GE that have an extensive multivendor installed computer base. Distributed processing would enable users to view a multicomputer, multivendor network as one large computer, according to forum leader Robotham, who is also Apollo's strategic projects manager.

In the distributed environment, application software would be written in modules. Depending on the task, modules would be sent to the CPU best suited for the job. Ideally, the dividing up an application among various CPUs would be transparent to end users.

"We're really just at the

Continued on page 46

Inside

- Server designed for TCP/IP-based LANs. Page 45.
- Cabletron rolls out Ethernet transceiver. Page 47.

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Co-location

FROM PAGE 41

a ruling that is supposed to ensure that enhanced service providers like Telenet have the same access to local basic services as the local exchange carriers themselves.

The Comparably Efficient Interconnection ruling "encourages but doesn't require" the operating companies to allow co-location, Walker states. Moreover, enhanced service providers located off premises must still pick up the tab for getting customer transmissions from the nearest local carrier facility to their own sites, Walker says. "So we end up paying a much higher price for basic services than the operating companies do," he adds.

Some regional holding companies will probably grant co-location privileges on a case-by-case basis — besides U.S. West, at least one other regional holding company reportedly is contemplating a limited trial of co-location with a service provider.

However, the regional holding companies are unlikely to support co-location as a blanket policy. Thus far, Mountain Bell has entered co-location agreements with only two companies: Telenet and G. E. Telemessager, an information provider that is already leasing space from the local carrier. "When we receive such a proposal, we'll check to see whether there is available space and whether it makes good business sense," says Blair Johnson, a Mountain Bell spokesman.

This is definitely not a "come one, come all" invitation. One remaining question is, How many carriers' switches will fit in one central office before Mountain Bell begins to feel crowded?

No limit?

Henry Levine, a partner with Washington, D.C., law firm Morrison & Foerster, insists that there is no limit to the number of co-located enhanced providers s central office can support — especially because co-location is able to extend to facilities a few blocks away with a high-speed pipe, such as a fiber-optic cable, connecting the two sites.

But even if they technically can always make room for one more, the divested Bell operating companies could justifiably argue that they have the right to choose their own tenants.

Mountain Bell Account Consultant Ronald McNamee says that his company may be less willing to share its space with major carriers U.S. Sprint Communications Co. and MCI Communications Corp., which could easily become competitors if U.S. District Court Judge Harold H. Greene approves the Department of Justice's recent recommendation to allow the local exchange carriers into interexchange and enhanced-service arenas.

"They're customers now, but if the Department of Justice's recommendations go through, we'd have competitors in the basement," McNamee points out.

Telenet, according to Walker, is hoping that Greene will indirectly pressure the local exchange carriers to embrace co-location. The service provider wants Greene to redefine the Comparably Efficient Interconnect plan to include "true equal access" and "identical costs" and then make compliance with the ruling a prerequisite for the local exchange carriers' entrance to interexchange and information service markets.

This "carrot" would "give the operating companies greater incentive for supporting co-location as the most efficient way to meet Comparably Efficient Interconnect requirements," Walker explains.

But until this happens, the divested Bell operating companies' central offices will be hot property, with telecommunications service vendors queuing up for those central offices that accept applicants. And unless the FCC puts its foot down, the lucky few who are granted square footage in a central location should be able to offer users significant cost savings over competitors who are left out in the cold.

Horwitt is *Computerworld*'s senior editor, networking

SCIENCE/SCOPE®

A searchlight nearly as bright as the sun helps police capture suspects at night. The Nightsun® searchlight is the most powerful ever developed for lightweight helicopters. With enough illumination to read a newspaper at 1,500 feet, it provides more than 30 times the power of previously used searchlights. Whereas traditional searchlights focus their light at the center of a beam, the Nightsun light equalizes its light across a 100-foot circle. Even fringe areas are fully lit, so that darkness no longer provides cover to vandals, burglars, auto thieves, and drug traffickers. Spectrolab, a Hughes Aircraft Company subsidiary, has produced Nightsun systems for over 300 helicopters in 80 percent of U.S. police agencies.

An infrared viewer found potential trouble spots in a large pharmaceutical plant during a five-day survey of a 57-building complex. Hughes' Probeye® infrared viewer scanned 5,000 areas of potential trouble and pinpointed 60 hot spots, most of which were in the electrical systems and motors. For example, the Probeye unit showed a heat buildup of 120°C at three cartridge-type fuses. Also, a 75°C rise was discovered at another electrical connection. The fuse could have failed during a production run, resulting in costly downtime. The Probeye viewer sees heat the way a camera sees light, converting it instantly into an image seen through the eyepiece.

Laser targeting systems for military aircraft can now be tested safely on the flight line. Until now, testing lasers on the flight line has been prohibited by safety regulations since the high levels of radiated energy involved could be hazardous to the eyes. Alternatives are to conduct laser tests on a remote range or to remove a laser pod from an aircraft and take it to a shop for dismantling. The latter procedure could take up to nine hours and deprives a fighting unit of a valuable electro-optic sensing pod in the event of an emergency. The new portable Laser and FLIR Test Set (LAFTS), designed and built by Hughes for the U.S. Air Force, can be carried to the flight line and easily attached to a sensor pod. The total time to mount, conduct all tests, and dismount the tester from the aircraft takes less than 15 minutes. LAFTS fully tests the laser and forward looking infrared (FLIR) systems and verifies proper alignment between them. TV performance testing/alignment capability is also available. The system can also be applied to test electro-optic sensors on helicopters, armored vehicles, and ships.

A flight engineering simulator will help develop new military aircraft and systems as well as improve existing ones. The system will be operated by General Dynamics, which produces the F-16 fighter for the U.S. Air Force. The simulator will help serve as proof that design concepts are feasible and allow comparisons to be made without risk of substantial capital investment. It will use technology from F/A-18 training systems developed for the U.S. Navy and Marine Corps. Hughes will supply an image generation and display system, plus operator control and equipment monitoring hardware. The simulator will include 40-foot domes, each housing General Dynamics cockpits and avionics systems.

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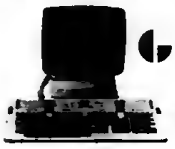

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Bell Atlantic proposes enhanced service

BY ELISABETH HORWITT
CW STAFF

ARLINGTON, Va. — Bell Atlantic Corp. has become the first of the regional Bell holding companies to file a plan with the Federal Communications Commission for offering an enhanced telecommunications service under the Comparably Efficient Interconnection Compliance Plan.

The enhanced service would provide message storage facilities to dial-up information services that supply callers with recorded information on the weather, local entertainment and other topics. The messages would be stored on the central office facilities and accessed over the public switched lines of Bell Atlantic operating companies.

The new service would mean that "information providers no longer have to invest in costly equipment," thus "substantially reducing the barriers to market entry," said John W. Seazholtz, vice-president of technology planning and marketing for Bell Atlantic.

Intended as the first in a series of enhanced offerings, Bell Atlantic's proposed service should give the company — and other regional Bell holding companies — a better idea of how to gain FCC approval for entry into the enhanced services market. The Comparably Efficient Interconnection plan, which is the major requirement to be met, dictates that a regional Bell holding company's regulated business cannot give preferential treatment to an enhanced service.

Bell Atlantic's compliance plan states: "No special interfaces, signaling, abbreviated dialing or other functionalities will be provided to Bell Atlantic's enhanced service or to other vendors through this offering."

A second set of requirements to be met by Bell Atlantic is the FCC's Joint Cost Order, published on Feb. 6, which is intended to ensure that the regional Bell holding companies do not subsidize enhanced services with revenue from the regulated side of their businesses.

Third, Bell Atlantic has stated that it will not provide its enhanced service with customer record information from the regulated side of its business, if customers request that this information be withheld.

Finally, U.S. District Court Judge Harold H. Greene must approve the Department of Justice's recommendation that the Bell holding companies be allowed to enter the information services market. Bell Atlantic is "hopeful that this will take place and, meanwhile, we'd like to get the ball rolling," spokesman Ken Pitt said.

Net manager bridges gap

BY PATRICIA KEEFE
CW STAFF

MOUNTAIN VIEW, Calif. — Bridge Communications, Inc. has introduced NCS/AT, which it claims is the first high-performance Microsoft Corp. Xenix-based network management server designed for local-area networks (LAN) based on Transmission Control Protocol/Internet Protocol (TCP/IP).

Bridge is offering the initial release of NCS/AT under TCP/IP because it said it sees high demand in that arena. "Many commercial users have learned that as the only fully standardized LAN protocol set available today, TCP/IP is the only way to achieve true interoperability between multivendor systems," Bridge President William Carrico said. Bridge said it will market a version of NCS/AT based on Xerox Corp.'s Xerox Network Systems protocol later this year.

The NCS/AT Network Control Server allows centralized control and monitoring of computer resources attached to a TCP/IP-based Ethernet (IEEE 802.3) or Bridge 5M bit/sec. broadband LAN.

Designed for medium- to large-size TCP/IP LANs, the NCS/AT supports up to 128 Bridge communications and/or gateway server units. It is based on Compaq Computer Corp.'s IBM Personal Computer AT-compatible Deskpro 286 with a 40M-byte hard disk drive.

Manipulating data to do network accounting, diagnose faults and predict performance bottlenecks becomes critical as network size increases, Carrico added. "A simple graph of peak-load hours can show the network manager how to manage network usage more effectively, or a log showing unusually frequent refused accesses to a given host may indicate that another server should be added to the LAN," he said.

The NCS/AT stores up to 2,048 logical names and configuration information down to the port level for each network-attached server. A central file of up to 512 user-defined command macros lets the user execute complex command sequences, according to the vendor.

Available this month in both Ethernet and broadband versions, the NCS/AT is priced at $12,900. For users with installed PC ATs, Bridge also offers an NCS/AT upgrade kit for $5,000.

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AT&T

FROM PAGE 41

5000s — originally produced by Sperry Corp. — and a Unisys B-6930, originally made by Burroughs Corp.

The university acquired ISN as part of a $1.3 million purchase of AT&T telecommunications equipment, including a System/85 voice network for 3,600 telephones. The initial ISN cost was about $25,000, including support for 50 connections.

Both the ISN and the System/85 private branch exchange (PBX) are located in the same large telephone closet underneath the school's science building, but each has a very different task. Twisted-pair wires enter the telephone room from campus workstations, micros and telephones and are directed to either the PBX or the ISN switch. A single strand of four telephone wires is literally divided in half, with two wires going into the ISN and two going to the System/85.

"ISN's getting a free ride on the campus telephone system," says Steve Patrick, director of the university's administrative systems. But MIS must add about $500 for the cost of connecting each terminal or PC to the ISN network, he adds.

Data enters the ISN switch at 9.6K to 19.2K bit/sec. The ISN can handle total throughput of up to 8.6M bit/sec.; the fiber-optic cable between campus buildings, more than 8M bit/sec. The resulting network allows more than 200 university staffers and hundreds of students access to the voice/data system from thousands of telephone jacks all over the campus. They can also send files from 110 IBM PCs and compatibles that are scattered around three computing labs on campus. Students who elect to install a PC in their dormitory rooms can send in assignments electronically from 10 dorms or from three classroom computer labs. Within a building, AT&T's Starlan, a twisted-pair 1M bit/sec. local-area network, connects PCs and terminals to the ISN concentrators. AT&T 3B2s act as Starlan file servers, Patrick says.

The ISN system will give educators new computing options, too. University officials now plan to link with a Data General Corp. library index system that is running on an IBM 4381 in Madison, Wis., located about 110 miles away. Also, an ISN remote concentrator will be installed in Madison and connected to Stevens Point over a leased line. More links are envisioned between Stevens Point and other University of Wisconsin campuses.

It is now practical for end users to select whatever computer on the network that has the application, processing power or data they need. "We feel we can serve all our users best by giving them an appropriate computer for their task," says Bruce Staal, chairman of the university's mathematics and computing department.

A single end-user environment is being constructed so that users can dial up a remote 3B to get word processing applications, a remote Digital Equipment Corp. Microvax II to get Statistical Package for Social Sciences programs or one of four Unisys 5000 computers that support the Oracle Corp. data base.

As a result of the early ISN installation, the campus has become a showplace for AT&T networking technology. AT&T brings prominent commercial customers to the site to show how ISN and Starlan work together — and to demonstrate some early-support products that are not generally available. One such example is a new piece of terminal emulation software for Starlan.

Forum

FROM PAGE 41

threshold of network computing right now. The good news is lots of pieces are already available," Robotham observed.

The forum will take advantage of industry-standard tools, concepts and protocols such as X-windows, a multiwindowing standard formulated by MIT's DEC- and IBM-funded Project Athena; batch queuing from the National Aeronautics and Space Administration's Ames Research Center; and the network computing tools Apollo recently announced.

"The forum will be complementary with other standards' forums rather than competitive," Robotham noted. "I don't want to set unrealistic goals for the forum. We're looking for a practical-minded focus."

One of the forum's initial goals is to select appropriate tools that can potentially address network computing problem areas, Robotham said.

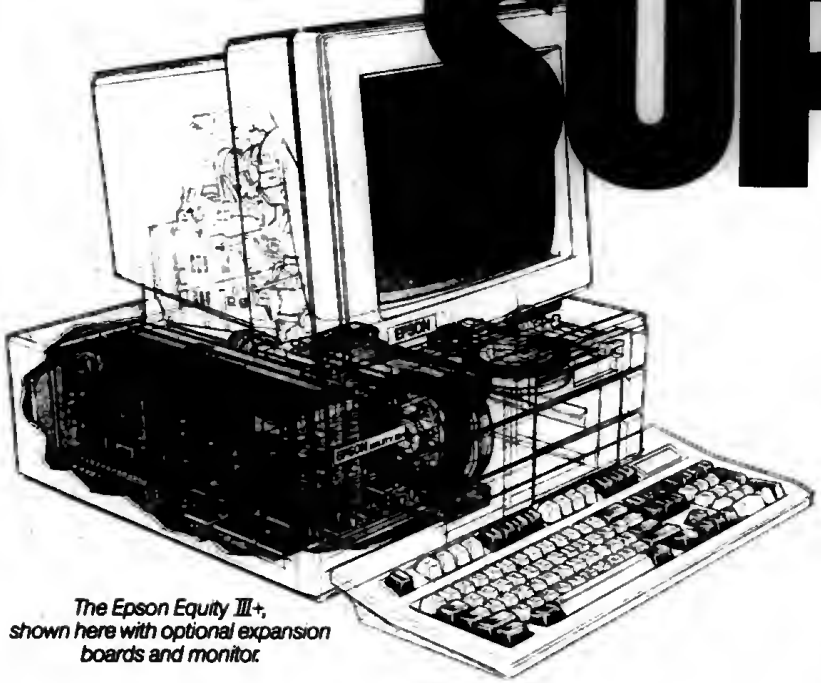
Hardware vendors will have to commit to the set of common tools. Software application suppliers can then restructure applications to take advantage of them, be explained.

Franklin Moss, vice-president of software development at Stellar Computer, Inc., said writing distributed applications is difficult. "The technique used to distribute one application is very different than what you would use in another distributed application," Moss observed. Sometimes resources are not used effectively because the system can waste bandwidth communicating application pieces to different nodes when it is more cost-effective to run on one node, he said.

GE's own experience in solving distributed processing dilemmas has been unsuccessful, Most said, adding that his firm now wants to buy a distributed processing solution as opposed to devising its own.

Westinghouse wants workstation users in California to access the two Cray Research, Inc. Cray-1 supercomputers in Pittsburgh, according to H. L. Layman, a Westinghouse consultant for engineering computing planning. Perhaps the forum can help bring about distributed processing that is transparent to end users, he said. The Network Computing Forum will meet twice this year, in June and in the late fall. An executive committee will discuss policy issues while a technical review committee reviews plausible solutions.

SUPER



The Epson Equity III+, shown here with optional expansion boards and monitor.

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NEW PRODUCTS

Local-area network hardware

Cabletron Systems, Inc. has announced its **MT-800 Ethernet Multiport transceiver**, which incorporates the firm's Lanview built-in diagnostic system.

The unit also incorporates a multiport capability consisting of eight ports for connection to Ethernet/IEEE 802.3 host units. Each port implements transmit, receive and collision functions. A port is provided for connection to an external transceiver.

The MT-800 costs $975 per unit.

Cabletron Systems, P.O. Box 6257, Cabletron Industrial Park, 10 Main St., E. Rochester, N.H. 03867.

Lantel Corp. has introduced its broadband radio-frequency voice network, called the **Lantel 810 Intelligent Broadband Intercom** system.

The system is said to be a networked voice application for two-way broadband cable networks. It uses a distributed-intelligence architecture for intranetwork voice services over networks using a 192.25-MHz translation offset.

A minimum network configuration consists of three 810 stations and a network translator such as the Lantel 192 CRU. Station extension numbers are held in memory.

The Lantel 810 costs $1,080.

Lantel, 3100 Northwoods Place, Norcross, Ga. 30071.

Local-area network software

Think Technologies, Inc. has announced a personal computer version of its **Inbox** pop-up desktop communications applications software as well as a version of Inbox for Apple Computer, Inc.'a Macintosh.

With Inbox, users on a network can create, send and receive memos, messages and files. Inbox supports Apple'a Appletalk and by the second quarter, Think said, it will also support IBM'a Netbios.

Inbox for the Appletalk micro version allows communications between Macintoshes and IBM Personal Computers. It costs $195 per connection.

Release 2.0 of Inbox for the Macintosh supports Apple'a Appleshare and Appletalk File Protocols. It costs $350 for a starter kit and $125 per connection.

Think Technologies, 420 Bedford St., Lexington, Mass. 02173.

Infosphere, Inc. has introduced **Comserve**, a modem server for Apple Computer, Inc.'a Appletalk networks.

Comserve provides terminal communications to Apple Macintosh local-area networks and supports Hayes Microcomputer Products, Inc.-compatible modems at speeds from 300 to 9.6K bit/sec. The software runs concurrently in the background, eliminating the need for dedicated hardware.

Comserve can be installed on Apple'a Appleshare file server and is transparent to the leading Mac telecommunications products. It costs $195 per server.

Infosphere, 4730 S.W. Macadam Ave., Portland, Ore. 97201.

Network management

M/A-Com Telecommunications has expanded its X.5 packet-network offering, the Integrated Packet Network (IPN), to include the **Micro NCP** network control processor.

The Micro NCP is said to offer IPN management and control capabilities such as down-line loading of all packet switching exchanges, security checking and call-record storage.

The Micro NCP is available in redundant and nonredundant configurations. It is priced from $70,000.

M/A-Com Telecommunications, 11717 Exploration Lane, Germantown, Md. 20874.

Customer-premise equipment

Lightspeed has announced the **Lightspeed Rapport** system, a viewing station said to allow the telecommunication of design work to remote locations.

The Rapport system transmits full-color images over standard telephone lines. The images, created using either a color pre-press system or the Lightspeed Design System, serve as comps or production proofs. Users can transmit, review, annotate and store up to 40 images.

The Rapport system includes an IBM Personal Computer AT compatible with 1M byte of memory.

The Lightspeed Rapport costs $28,900.

Lightspeed, 47 Farnsworth St., Boston, Mass. 02210.

Links

KMW Systems Corp. has announced the **Auscom 8400 VME Channel Interface**.

The Auscom 8400 is said to transfer data between IBM channels and the VMEbus system memory at transfer rates up to 1M bit/sec. Data-code conversion can be accomplished during data transfers. Software can be ported to run under the operating system currently being run on the system processor board.

An on-board bit-slice microcontroller supervises communications as well as channel activity with the VME system CPU.

The Auscom 8400 costs $3,650.

KMW Systems, 100 Shepherd Mountain Plaza, Austin, Texas 78730.

Alloy Computer Products, Inc. has announced **Mainline**, a communications gateway product.

Mainline is said to provide connectivity to mainframes from terminals and printers in its PC-Plus multiuser, multiprocessor clusters. Mainline allows terminals on the PC-Plus cluster to operate in the IBM 3278 emulation mode.

Continued on page 48

POWER.

comes with a standard 640 K RAM, you can take it all the way up to a head-snapping 16 megabytes.

To customize an Equity III+, there are nine expansion slots, each with rear panel access. Need hard disks? Floppies? Streaming tape back-up? Equity III+ gives you slots for five half-height mass storage devices.

With Epson's innovative modular chassis, the Equity III+ is designed to be state-of-the-art for years to come. There are two extra ROM sockets for your custom firmware, and to boost numerical horsepower, just pop an 80287 co-processor into the waiting socket. The system board even slides through the front of the chassis for easy access.

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EPSON
COMPUTERS

Continued from page 47

The product supports IBM SNA/Synchronous Data Link Control. It costs $2,995.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

Protocol converters

Digital Link Corp. has announced the **V.35/RS-449 T1 Converter & CSU Model DL551V.**

The product, which includes an integrated channel service unit (CSU), is said to permit direct connectivity of computers, local-area networks, satellite earth stations and high-speed, computer-aided design and manufacturing workstations to 1.544M bit/sec. T1 networks, such as AT&T's Accunet 1.5 service. The DL551V provides the D4 framing and density required for transmission over public or private T1 networks.

According to the vendor, fault-isolation capabilities provided by the unit include a CSU self-test, data terminal equipment loop-back and in-band network loop-back code detection.

The unit costs $3,995.

Digital Link, 133 Caspian Link Court, Sunnyvale, Calif. 94089.

Electronic mail

Cosy Marketing Group has announced **Cosy/VMS**, a product said to enhance group communications on the Digital Equipment Corp. VAX family of computers.

Features include structures for conferences or topics, conversations and mail; an interface to DEC VMS mail and other mail systems; no need for separate VMS identifications for conferencing users; multilingual prompts and Help-file capability; clerical-level user maintenance functions; conference archival and auto-delete functions; and ISAM file structure for low disk overheads.

According to the vendor, up to 40 connected users can be supported on a DEC Microvax II.

Prices start at $4,000.

Cosy Marketing Group, University of Guelph, Guelph, Ontario, Canada N1G 2W1.

RCA Global Communications, Inc. has announced **Ezaccess**, a software program said to connect a Wang Laboratories, Inc. VS series computer and up to 256 workstations to the RCA Globcom telex, telegram and RCA Mail electronic mail networks.

The software uses the Wang Office feature or a built-in menu to provide store and forward real-time telex sending and receiving capabilities throughout the U.S. and with 230 overseas locations. Ezaccess also provides connection to RCA Globcom's telex network information retrieval service. Incoming messages are delivered to the user's mailbox, and the software automatically handles conversions between the Wang word processing document and RCA telex formats.

A basic system is priced from $2,000.

RCA Global Communications, 201 Centennial Ave., Piscataway, N.J. 08854.

Wizard Computer Products Co. has announced an option to its Wizard Electronic Mail System called **Wizard C&S.**

Wizard C&S is a calendar and scheduling system said to allow users to schedule meetings, appointments and facilities. Features include the ability to display a daily schedule in addition to the details of a meeting and the confirmation status of each individual involved, to schedule meetings for groups and to display a week's schedule at a glance.

Meetings can be scheduled as confidential. Notification of meetings is sent when the meeting is scheduled and 10 minutes prior to the meeting time.

Wizard Mail operates on any IBM mainframe using CICS. It costs $3,000, and the Wizard C&S costs $995.

Wizard Computer Products, P.O. Box 1867, Greenville, S.C. 29602.

Modems/Multiplexers

Network Software Associates, Inc. has introduced **Adaptmodem 9600**, a combination high-speed synchronous modem and Synchronous Data Link Control (SDLC) communications adapter for IBM Personal Computers and compatibles.

The product is said to transmit data at 9.6K bit/sec. It is contained on a personal computer plug-in board and comes with automatic dialing control software.

The modem supports both dial-up and leased-line transmissions. The SDLC portion of the board includes all the necessary circuitry to interface to an SDLC communications link.

The Adaptmodem 9600 is priced at $1,795.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653.

Raycom Systems, Inc. has announced three synchronous **I/O modules** for its 5100-series fiber-optic multiplexer.

The V.35 Synchronous I/O module has a V.35 interface, and the RS-422 Synchronous I/O module has an RS-422 interface. Each handles eight channels and is available with either internal or external clock at speeds from 2.4K to 64K bit/sec. Three control lines are available in each direction for each channel. They operate at 1.2K bit/sec.

The third module haa 16 channels and an RS-232 interface.

The V.35 I/O module costs $2,100; the RS-422 and RS-232 I/O modules each cost $1,500.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301.

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Racal-Milgo has introduced the **Omnimux Net-1**, a networking time-division multiplexer with built-in network-management control capabilities.

The Omnimux Net-1 is said to support up to eight 1.544M bit/sec. aggregates, up to 255 interconnected nodes and up to 244 channels. The multiplexer also supports synchronous channels up to 1.008M bit/sec., asynchronous channels up to 19.2K bit/sec. and voice up to 64K bit/sec. Networks can be configured in point-to-point, star, ring or multilayer topology.

Software-controlled features include automatic alternate routing, aggregate bypassing, drop and insert and local-channel switching.

The Omnimux Net-1 is priced from $20,000.

Racal-Milgo, 1601 N. Harrison Pkwy., Sunrise, Fla. 33323.

Codex Corp. has announced the **2630 Dual Multipoint Data Modem** said to allow two independent multipoint applications to share a single 3002 unconditioned multipoint leased line.

According to the vendor, Frequency Division Multiplexed inbound channels allow the two different multipoint drops to communicate at the same time, with one channel capable of speeds up to 4.8K bit/sec. and the other capable of speeds up to 2,400 bit/sec.

Dual integral modem-sharing units are standard in the four- and six-port models of the 2630 and permit up to three devices to share either channel of a multipoint drop. All Codex 2630s have a built-in, asynchronous-to-synchronous converter.

Prices start at $4,200.

Codex, 20 Cabot Blvd., Mansfield, Mass. 02048.

Digilog, Inc. has announced a built-in **300/1200 bit/sec. asynchronous modem** for its Digilog 300, 400, 600 and 800 protocol analyzers.

The Hayes Microcomputer Products, Inc.-compatible modem is said to feature autodial and autoanswer capabilities.

The modem is priced at $650. Current owners of the Digilog protocol analyzers can upgrade for $750, according to the vendor.

Digilog, 1370 Welsh Road, Montgomeryville, Pa. 18936.

Diagnostic equipment

Systems Strategies, Inc. has announced **Test APPC** software, said to provide a standardized set of tests for evaluating the functionality of Advanced Program-to-Program Communications (APPC) on IBM systems or compatibles.

Test APPC is composed of three packages: TestLU6.2, EXLU6.2/CICS and EXLU6.2/S36.

They can be used independently or in combination to test and exercise LU6.2 and LU2.1. The software is said to have the ability to provide sample LU6.2 transaction programs.

It can also be used to create LU6.2 training packages, demonstrate LU6.2 functionality and troubleshoot customer problems.

TestLU6.2 costs $10,000 or can be rented for $1,100 per month. EXLU6.2/S36 and EXLU6.2/CICS cost $15,000 each or $2,250 per month.

Systems Strategies, 225 W. 34th St., New York, N.Y. 10001.

Renex Corp. has enhanced its **Datahawk** data line monitor to support seven color monitors for IBM Personal Computers and compatibles.

Datahawk is an add-on package for personal computers that allows users to perform testing and problem determination on dedicated or dial-up lines.

Datahawk also now gives users the ability to monitor and test data transmitted using the Baudot code, according to the vendor.

Datahawk is priced at $1,175. It requires 128K bytes of memory, one double-sided disk drive, an IBM monochrome or color display and Microsoft Corp. MS-DOS Version 2.0 or higher.

Renex, 1513 Davis Ford Road, Woodbridge, Va. 22192.

International Data Sciences, Inc. has enhanced its **Model 66 Green Box** high-speed error-rate test set to include the ability to communicate over DS1-level data links with D4 or extended superframe formats for T1 testing capability.

The Model 66 Green Box is a portable multipurpose bit-error test set. It performs tests such as bit-error rate, block-error rate, errored-seconds and counting synchronous losses.

Other features of the Green Box include the ability to generate, transmit, receive, analyze and display either of two pseudo-random test patterns.

The Model 66 Green Box tester is priced from $1,990.

International Data Sciences, 7 Wellington Road, Lincoln, R.I. 02865.

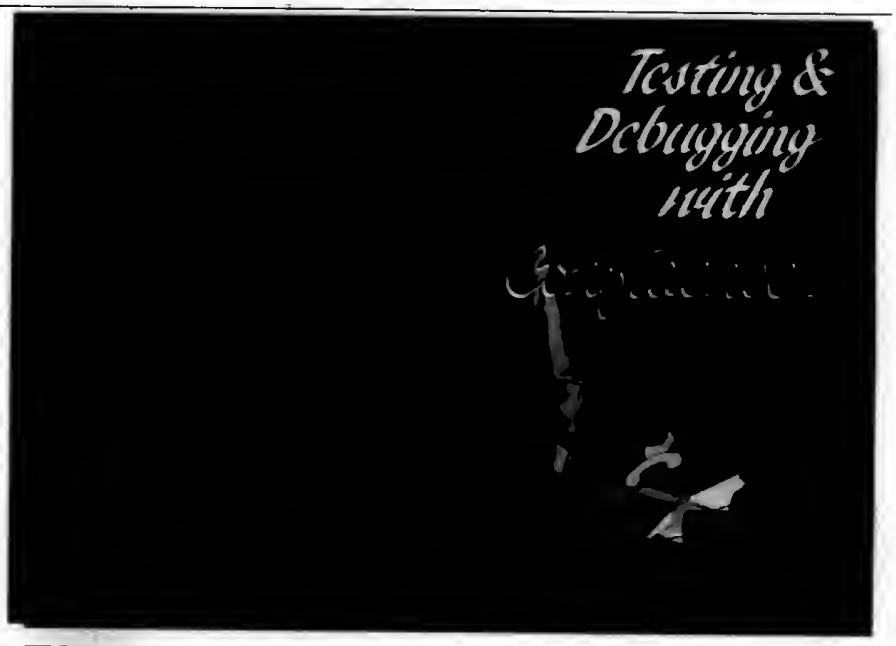
Cabling

Architecture Technology Corp. has announced the **Token-Ring Cabling System Planner.**

The Cabling System Planner was designed to assist with the planning and administration of an IBM cabling system. It allows users to layout, in grid fashion, various cabling system components and define the cable necessary to implement an IBM Token-Ring local-area network. The Planner can be used to change the layout.

Prices range from $99 for a small model to $495 for a large model or local-area network.

Architecture Technology, P.O. Box 24344, Minneapolis, Minn. 55424.



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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Early death at DEC

The absence of a couple of product names in Digital Equipment Corp.'a announcements two weeks ago hammered home the dangers involved in short product cycles.

There was no voluntary mention of the VAX 8600 or VAX 8650 in DEC'a presentations and product literature. The systems that not so long ago were billed as the atars of DEC's lineup were not even shown on a DEC chart ranking the VAX line by relative performance. At least the 1-year-old VAX 8200, VAX 8300 and VAX 8500 were mentioned as being replaced.

Not until someone asked what had become of the 8600 and 8650 did DEC officials acknowledge they aren't promoting those products because the newer models offer better price/performance ratios.

That makes sense for DEC because the new VAX 8530 and 6-month-old VAX 8550 do appear to offer comparable performance for better prices than the 8600 and 8650, while also of-

Continued on page 54

Wang replaces 2200 MVP

BY NINAMARY BUBA MAGINNIS
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. recently introduced the Wang CS small-business computer system, which replaces the 2200 MVP and MicroVP systems.

Current 2200 users can purchase a CS CPU to upgrade, but there is no trade-in allowance offered for old hardware, the vendor said.

Applications written for MVP and MicroVP systems can run unchanged on the CS and perform an average of 7% faster than non-very large-scale integration (VLSI) CPUs, Wang said.

Users' existing MVP and MicroVP peripherals, option boards and communication controllers will also reportedly operate with the new hardware.

The CS, based on VLSI technology, employs Release 3.0 of Wang's BASIC-2 multiuser operating system. Under the new release, BASIC-2 will support a maximum of 16 users per CPU, an increase of three over the old version. Release 3.0 has 22 enhancements, including Ramdisk, which allows CPU user memory to work as a high-speed disk.

Cache memory, located in the data storage cabinet, can also be used as a high-speed Ramdisk. For disk-intensive routines, both cache memory and Ramdisk can increase throughput by as much as 70% over the older systems'. The latest version of BASIC-2 can also run on any multiuser Wang 2200 system with 28K bytes of control memory.

The CS data storage cabinet can house either a 320K- or 1.2M-byte diskette, a 10M-byte removable Winchester disk drive, a 45M-byte streaming tape cartridge and combinations of 20M-, 32M- and 64M-byte fixed Winchester drives.

The cabinet can accommodate up to 192M bytes of disk storage. As many as 16 CS CPUa can reportedly share a disk system with the new multiplexer and multiplexer extenders.

A single printed-circuit board makes up the CS CPU. The processor includes 32K bytes of control memory and nine I/O slots.

The CS CPU is offered in two versions, the CS-2 and the CS-5. The CS-2 with 128K bytes of memory costs $4,950, and the CS-5 with 512K bytes of memory costs $6,400. The systems are also offered in four packaged configurations.

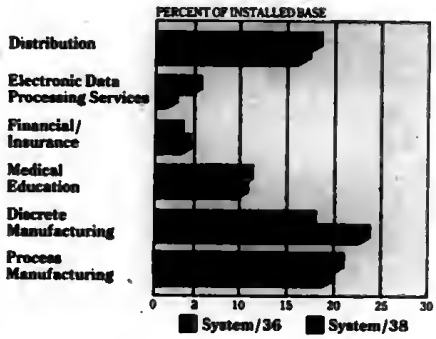
Prices for packaged configurations start at $6,950 for a CS-2 CPU with 128K bytes of user memory, a 22C11 dual controller, a 2236MXE terminal processor and a data storage cabinet with a 1.2M-byte diskette drive. Cost savings for CS packages can be as high as 28% for hardware

Continued on page 52

Data View

Industry breakdown

IBM System/36 and 38 show slight difference in target markets



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE CORP AND SANFORD C. BERNSTEIN & CO

Builders will test engine

BY JAMES CONNOLLY
CW STAFF

NASHUA, N.H. — A start-up company that introduced a graphics workstation for the publishing industry last year announced last week that the workstation engine will be offered to systems builders in markets such as computer-aided design, manufacturing, the military, process control, finance, publishing and education.

Bettex, Inc. said it has concluded no sales for its Bettex 3000 Superstation, but that systems will be delivered to five beta-test sites thia month.

The Bettex 3000 employs a combination of symbolic processing and parallel processing to achieve performance rates between 10 millions of instructions per second (MIPS) and 40 MIPS, Bettex officials claimed. The company also reported the system handles screen filling at more than 1 million pixel/sec., vector-to-raster-vector conver-

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Inside

- Nixdorf unwraps new products at Cebit. Page 52.
- Output Technology offers networking printer. Page 54.
- Pixar ties computer to Silicon Graphics and DEC systems. Page 54.

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Nixdorf unwraps gifts to mid-range systems

BY AMIEL KORNEL
SPECIAL TO CW

HANNOVER, West Germany — Nixdorf Computer AG has announced multiprocessor versions of its 8860 and 8870 families of mid-range systems and an IBM Personal Computer AT-type small system.

The recently launched 8870 Quatro processor, running on the firm's proprietary Niros operating system, can be hooked up in parallel using an intelligent-disk controller and 2M bytes of cache memory, Nixdorf said. Nixdorf also said users can now cluster up to eight 8860 processors, linking up to 100 terminals. Nixdorf developed a fast bus and modified the system's Didos operating system to permit data processing departments to develop transaction-oriented applications.

The firm also unwrapped the PC8810 M55 personal computer, an Intel Corp. 80286-based PC AT compatible. Priced at about $8,000 and ready for delivery, Model 55 includes an emergency power supply and remote-switching capability.

According to Rolf Kriescher, director of product marketing for small business systems, Model 55 includes a board from Japan's Matsushita Electric Industrial Co. similar to the one used in NCR Corp.'s PC8. It can be used as a stand-alone personal computer or as a multistation system. It runs Microsoft Corp.'s MS-DOS 3.2 and Unix.

The machine can run in terminal emulation mode while connected to hosts from such suppliers as Digital Equipment Corp., IBM and Siemens AG. The PC is also being positioned as an intelligent workstation with the firm's 8870 Quatro line.

Vice-chairman Arno Bohn said Nixdorf will be looking to increase its presence in the U.S., which currently accounts for 5% to 6% of its sales.

Efforts to win contracts in the retail sector will continue, he said, hinting that discussions are under way with Sears, Roebuck and Co.

He added that Nixdorf is creating a U.S. division for its banking products and has installed 18 pilot installations of its Unix-based Targon systems.

Kornel is a correspondent for CW Communications International News Service's European bureau.

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According to W. Thomas Castleberry, Senior Vice President, Visa U.S.A.,

"We selected CompuServe because they were technically responsive to the unique market requirements of a point-of-sale system. CompuServe was willing to meet our performance standards at a competitive price."

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Builders

FROM PAGE 51

sion at more than 100,000 vector/sec. and hyphenation and justification at more than 75,000 char./sec.

The system is currently designed to operate with Microsoft Corp. MS-DOS-based front-end systems but can be adapted by Bettex to utilize other front ends, the vendor said.

The product's three primary processors include a symbolic processor and a general arithmetic processor based on Texas Instruments, Inc.'a technology and a proprietary pixel output processor. The processors operate in a parallel manner. A basic system costs $50,000.

Wang

FROM PAGE 51

and 24% for monthly maintenance compared with MicroVP package prices, Wang officials claimed.

The 2275MUX multiplexer allows any combination of two, three or four 2200, MicroVP or CS CPUs to share a single data storage cabinet. Users can add extenders to connect up to four CPUs each. In a multiplexed configuration, up to 16 CPUs can share as many as three data storage cabinets. The CS-2 and CS-5 are scheduled to ship in June.

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Sharon B. Weinberg, President of Codd & Date Consulting Group and a former relational database consultant with IBM® responsible for releases of DB2, will review Dr. Codd's point-by-point comparison of SUPRA Release 1.3 and Release 2 of DB2. She'll demonstrate why Dr. Codd concluded that SUPRA adheres to 10 of his 12 basic rules for the relational model, versus DB2's 7 of 12, and explain why he stated, "SUPRA's rating is the highest achieved of all those I have reviewed to date."

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Pixar ties system to Microvax

SAN RAFAEL, Calif. — Pixar has introduced interfaces to tie its Pixar Image Computer to Silicon Graphics, Inc.'s 3100 series and the Digital Equipment Corp. Microvax II.

Pixar had earlier been available as an add-on for Sun Microsystems, Inc.'s Sun-3 and Symbolics, Inc.'a 3600 family of systems. The Microvax II interface is intended to provide DEC Ultrix users with advanced image processing and computer graphics in a single system.

Pixar also announced a C compiler that allows standard C programs to run on the image computer. The compiler will be included in Pixar's Chaptools, which provides software development tools as well as the source code for the system's runtime environment, Chaplibraries. Chaptools costs $10,000.

Pixar also announced Chapreyes, a software package designed to render images of three-dimensional objects and scenes in a fraction of the time that a similar operation would take on a general-purpose computer.

The vendor said the host interfaces will be available during the second quarter. The Pixar Image Computer costs $79,000.

Networking printer out

SPOKANE, Wash. — Output Technology Corp. has announced a dot matrix printer designed with built-in networking capabilities including a network communication controller and memory storage unit.

The Trimatrix 850 Printnet is one of a series of 850 char./sec. printers recently introduced by Output Technology. According to the vendor, users can connect any device capable of serial communication, including computers, printers and modems, to the Trimatrix 850 Printnet.

"Many people find local-area networks too expensive and more complex than they need. [The 850 Printnet] allows resource sharing to be done simply, without a lot of fuss and expense," said Roy Messena, director of marketing for Output Technology.

The network printer costs $2,995.

Output Technology also announced the 888XL for use with IBM System/34, 36 and 38 minicomputers, the 889XL for use in IBM 3270 environments and the 850XL serial dot matrix printer, which can be used for 80-col. or 136-col. printing.

The 888XL costs $3,795, the 889XL costs $3,995, and the 850XL is priced at $2,395.

Early death

CONTINUED FROM PAGE 51

fering the DEC Vaxbi capabilities that the Unibus-based 8600 and 8650 are lacking.

But what makes sense for DEC may not be fair to its customers, particularly the more than 2,000 owners of 8600s and 8650s. At least the 8200, 8300 and 8500 customers, who saw their systems made obsolete a year after they were announced, know DEC might offer an upgrade package to help them move to the replacement models. The people who jumped at the chance to buy 8600s and 8650s in 1985 may be at a dead end less than three months into 1987.

DEC's replacement of its product line every year with little capability should not only concern users but should also bother DEC. The strategy dents DEC's promise of letting customers grow with a single hardware and software platform.

The 8600 was announced in late 1984, delivered in early 1985 and effectively replaced by the 8650 in late 1985. Now both the 8600 and 8650 have quietly slipped into oblivion. That would be shocking if DEC was operating by the computer industry's old standard of three- to five-year product cycles. Under that standard, the 8600 and 8650 would still be adolescents.

The result of the one-year turnover strategy is that those who spend $400,000 for a system get stuck with no way to grow with that system — unless they want to follow DEC's advice and write hefty checks to add more CPUs and clustering tools — and minimal opportunity to recover their investments on the used market.

Some of DEC's biggest customers have said they aren't upset with the company's strategy. They have been kept informed of DEC's plans since before the 8600 was announced, and they have space in their computer rooms and their budgets for the Unibus systems. But the users who have to watch their backs are in the small and medium-size companies and don't have the big user's flexibility.

If the DEC strategy sounds familiar, it's because it should. DEC is adopting the tactics of a well-known computer company that happens to be DEC's favorite target these days. Each day, DEC is acting more and more like IBM in how it treats its customers and how it deals with third-party competitors.

Connolly is *Computerworld*'s senior editor, systems & peripherals.

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NEW PRODUCTS

Printers/Plotters

Output Technology Corp. has announced the **Trimatrix 850XL** serial dot matrix printer.

The printer is said to provide a burst speed of 850 char./sec. and a throughput of 240 line/min. The Trimatrix 850XL is suitable for 80-col applications but, according to the vendor, was designed for 136-col printing. It is capable of handling up to six-part forms.

Features include front-panel menu programming, multipitch printing, front and bottom paper feeds, an 8K-byte data buffer, serial and parallel ports and Epson America, Inc. and Digital Equipment Corp. emulations.

The Trimatrix 850XL costs $2,395.

Output Technology, Suite #6, E. 9922 Montgomery, Spokane, Wash. 99206.

Ithaca Peripherals, Inc. has announced the **Pcos Series 50** of compact stand-alone 40-col dot matrix printers for point-of-sale applications.

Three models make up the series: the Model 51 Receipt Printer, the Model 52 Journal/Receipt Printer and the Model 53 Enhanced Journal/Receipt Printer. The printers utilize bidirectional, short line-seeking logic. According to the vendor, print speed can be greater than 340 line/min.

Other features include a standard Centronics Data Computer Corp. parallel port with an optional RS-232 port to 19.2K bit/sec. with a 2K-byte buffer.

The basic parallel receipt printer is priced at $699.

Ithaca Peripherals, 147 Main St., Groton, N.Y. 13073.

Burr-Brown Corp. has announced the **TM3100 Thermal Bar Code Printer** and the **TM3200 Dot Matrix Bar Code Printer**.

The TM3100 is a demand-label printer capable of printing labels up to 2.2-in. wide at 1-in. per second. Maximum dot density is 101 dot/in. Four expandable font styles are available.

The TM3200 is a tractor-feed printer said to print 22 different bar code symbologies with 120 dot/in. horizontal resolution and 72 dot/in. vertical resolution. Characters are in a 9-by-7 matrix and print speed is 150 char./sec.

The TM3100 costs $2,595 and the TM3200 costs $4,495.

Burr-Brown, P.O. Box 11400, Tucson, Ariz. 85734.

Power supplies

Lowell Corp. has introduced the **Micropower II** computer power distribution center for mini and microcomputer systems, networks and word processors.

The single-phase line conditioner is said to exact the electrical standards for the systems. It prevents sags, surges, transients and outages from damaging hardware that cause data loss.

The system provides 3- to 10-kVA output ratings and plugs into any 240V outlet.

The Micropower II computer power-distribution center is priced from $2,000 depending on output options.

Lowell, P.O. Box 158, 97 Temple St., Worcester, Mass. 01613.

NCR Power Systems has announced a four output **switching-power supply unit** rated at 500W total power.

The unit is said to utilize metal oxide semiconductor field-effect transistor technology for lightweight, cool operation. Auxiliary outputs are controlled by a magnetic switch technology. Standard features include 50-KHz switching speed, 40 msec average hold-up time, overvoltage protection and overcurrent protection.

NCR Power Systems also offers the 500W power system in semicustom configuration with individual output characteristics tailored to the needs of specific applications, the vendor said.

Price for the standard unit is $824.

NCR, 3200 Lake Emma Road, Lake Mary, Fla. 32746.

Dranetz Technologies, Inc. has announced its **Series 656 Disturbance Waveform Analyzer**.

The AC-power waveform analyzer is said to be capable of monitoring and analyzing power-line disturbances for up to a month, storing the data in nonvolatile memory and displaying it on a built-in CRT.

Features include on-line Help routines, a touch-screen interface and a zoom capability, allowing details of waveforms to be closely examined. Hard copy printouts can be made via a built-in printer.

The Series 656 Disturbance Waveform Analyzer is priced at $9,750.

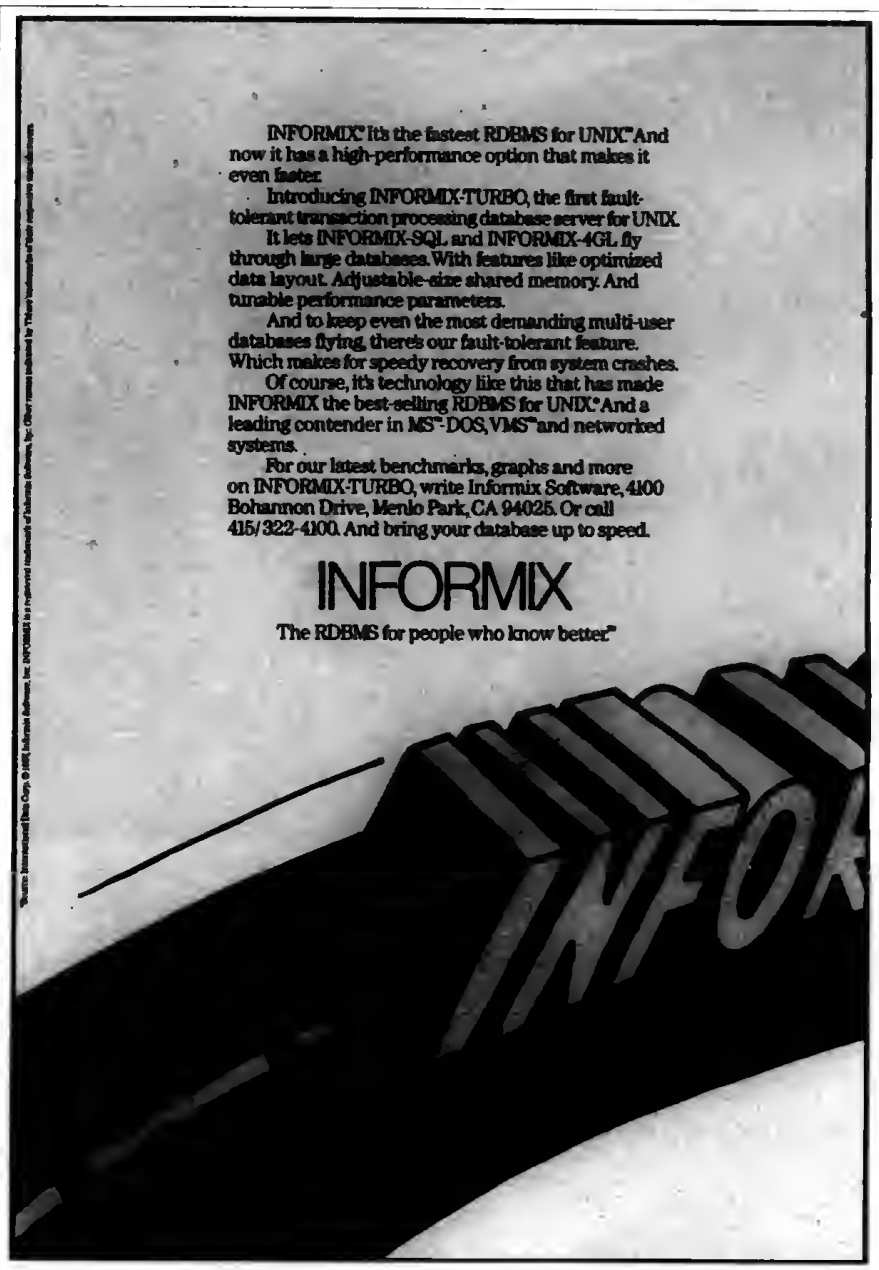
Dranetz Technologies, P.O. Box 4019, Edison, N.J. 08818.

Triad Power Systems has introduced the **MP-1** and the **MP-2** on-line uninterruptible power supplies for microcomputers, common peripherals and other power-sensitive equipment.

The MP-1 is rated at 200W and the MP-2 is rated at 400W continuous output. Ride-through time is 12 min at full-rated load and about 30 min at half load. Features include an audible alarm.

The MP-1 is priced at $795 and the MP-2 costs $995.

Triad Power Systems, 10362 Miller Road, Dallas, Texas 75238.



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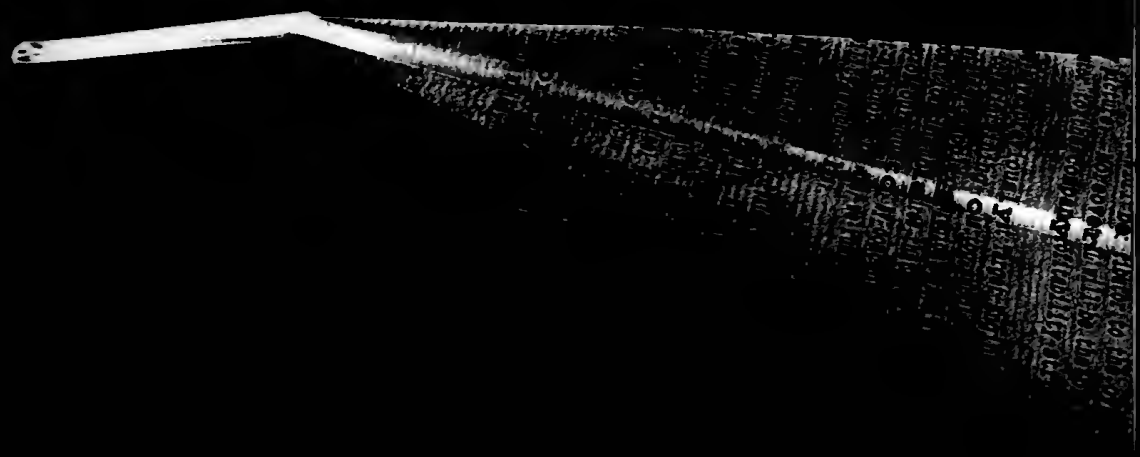

Fasten your seatbelts. The new Pinwriter® P9XL printer from NEC is about to take off.

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It cruises at 400 characters per second in draft mode, 140 characters per second in letter quality mode.

Which means it can really make those business letters fly. In fact, no other 24-pin printer is faster.

And because it uses a 24-pin printhead and a multistrike film ribbon—the same kind that's used in typewriters and letter-quality printers—the P9XL also delivers better print quality than its competitors. It even prints in color.

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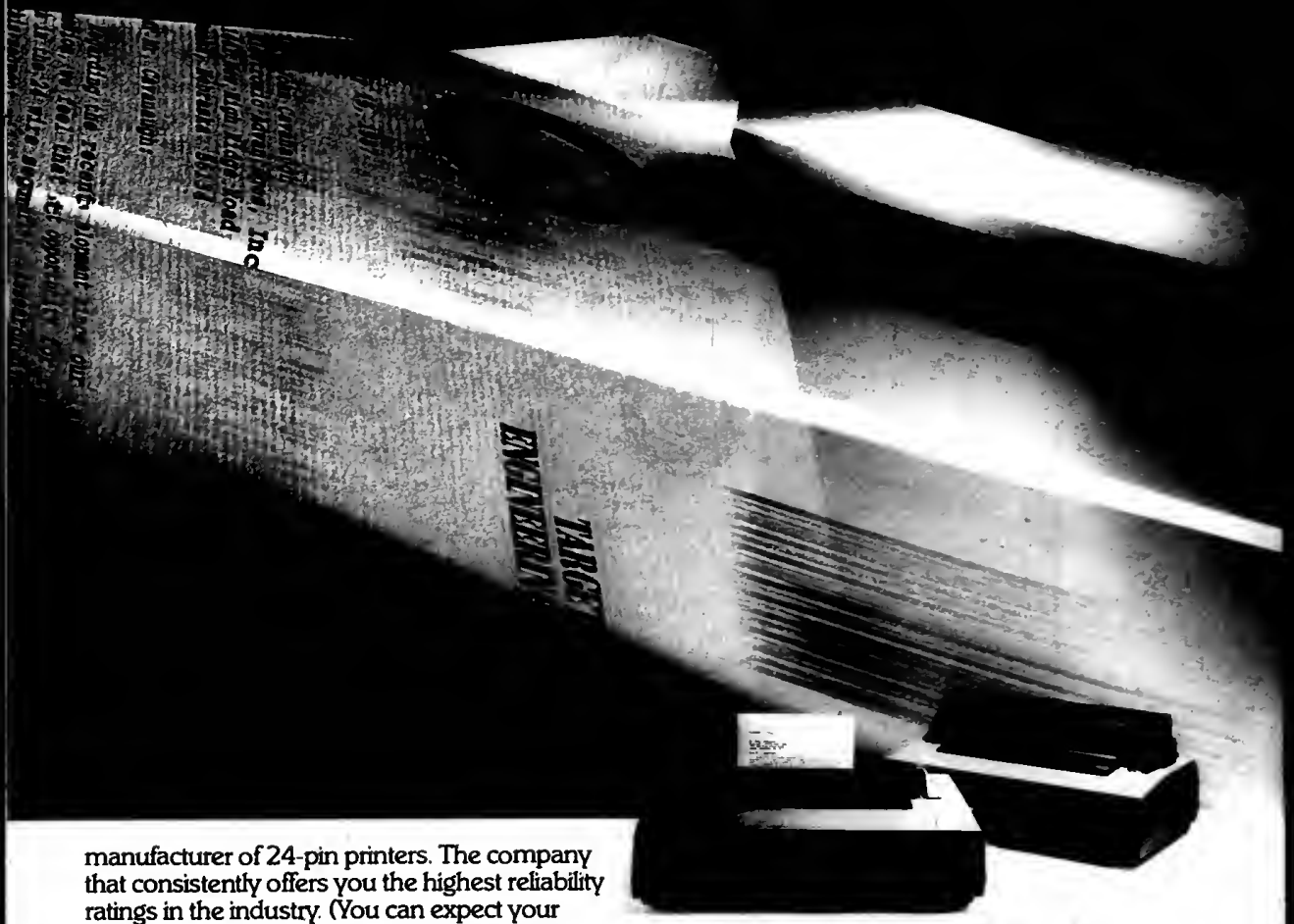

manufacturer of 24-pin printers. The company that consistently offers you the highest reliability ratings in the industry. (You can expect your P9XL to run for five years before it might need a repair.)

So don't waste any more time. Fly down to your nearest dealer and ask to see the new Pinwriter P9XL. Or call NEC at 1-800-343-4418 (in MA, (617) 264-8635). Or if you prefer, write to NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

NEC PRINTERS. THEY ONLY STOP WHEN YOU WANT THEM TO.

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Auxiliary equipment

Electro Standards Laboratory, Inc. has introduced its **Models 303 and 308 Sure-Guard** surge protection devices.

The devices were designed to protect terminals and computers by suppressing large voltage transients that may damage RS-232 ports.

The Sure-Guard installs between the data cable and the equipment connector to suppress the voltage transients. The Model 303 protects transmit data, receive data and signal ground inputs. The Model 308 protects five handshake control signals in addition to transmit data, receive data and signal ground inputs.

The Model 303 costs $34. The Model 308 costs $44.

Electro Standards Laboratory, P.O. Box 9144, Providence, R.I. 02940.

Input devices

Barcode Industries, Inc. has added a series of bar code readers to its **Mindreader** line.

The bar code readers are said to support the IBM 3179, 3180, 3191, 3196 and 5291 terminals as well as the Digital Equipment Corp. VT220 and VT240, the Unisys Corp. UTS-30, the AT&T PC 6300 and Unix PC 7300, the Zenith Data Systems Corp. 148, 150, 151 and 241 and the Wyse Technology 50 machines.

The readers connect to the terminals as wedges between keyboard and screen.

Signals from the bar-code reader emulate input from the keyboard.

Input devices supported include pens, laser scanners and magnetic stripe or bar-code badge readers.

The Mindreader line ranges in price from $595, including light pen, to $2,090, including hand-beld laser scanner.

Barcode Industries, 17 Barstow Road, Great Neck, N.Y. 11021.

Seiko Instruments U.S.A., Inc. has announced its **Screenplay** tablets, a family of eight digitizing tablets and tables.

The Screenplay tables are desktop units that function as data input devices attached to personal computers or terminals. The Screenplay tabletop or floor-mounted digitizing tables communicate directly with a mainframe computer.

The tablets range in size from 8 in. by 12 in. to 18 in. by 25 in. The tables range in size from 17 in. by 24 in. to 42 in. by 60 in. Prices range from $495 to $1,895 for the tablets and from $3,495 to $5,888 for the tables.

Seiko, 1130 Ringwood Court, San Jose, Calif. 95131.

Maintenance equipment

Gen/Comp, Inc. has introduced its **Model 2042 DMA Interface** for the Unibus.

The interface and interprocessor link is said to emulate the Digital Equipment Corp. DR11-W, DR11-B or DA11-B. It features hardware parity generation and checking of transferred data to assure data transfer integrity. Switch-selectable direct memory addressing (DMA) pacing and one- to 16-cycle burst lengths are possible.

The Gen/Comp Model 2042 DMA Interface is priced at $1,000. An optional on-board opto-isolator for long-line data transmission costs an additional $500.

Gen/Comp, Six Algonquin Road, Canton, Mass. 02021.

Applied Memory Technology has introduced its **DX525AT/P** portable Winchester disk drive test system.

The system was designed to execute a linked sequence of performance tests on either enhanced small device interface or ST506 interface Winchester disk drives. Features include a 40-col thermal printer and built-in drive power supplies.

Both automatic and engineering modes of operation are offered. Tests included in automatic mode are interface status, disk format and media verify.

Single unit pricing for the DX525AT/P is $6,800.

Applied Memory Technology, Unit E, 2822 Walnut Ave., Tustin, Calif. 92680.

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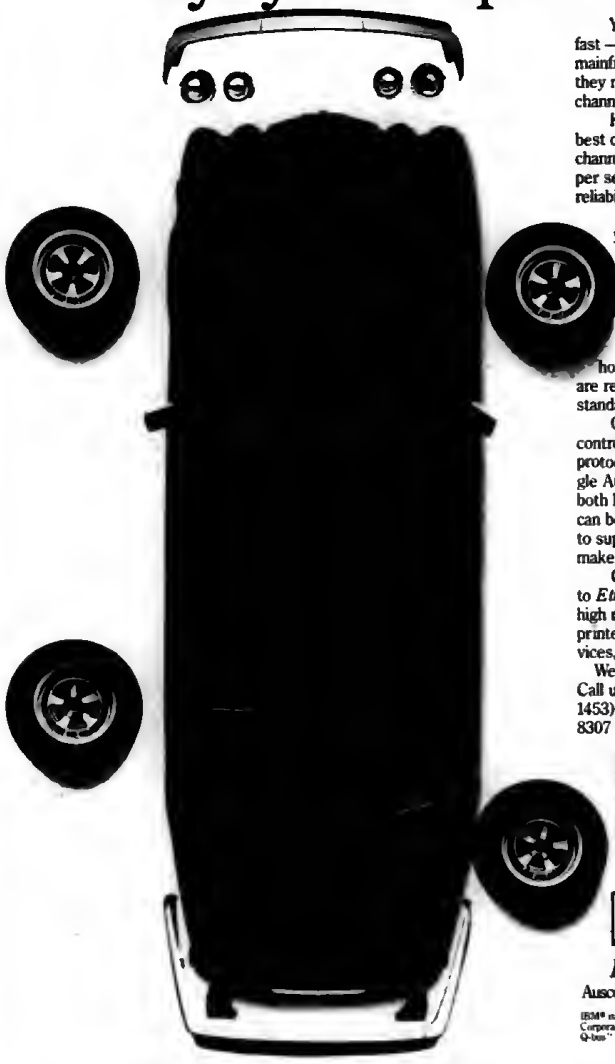

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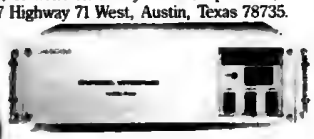

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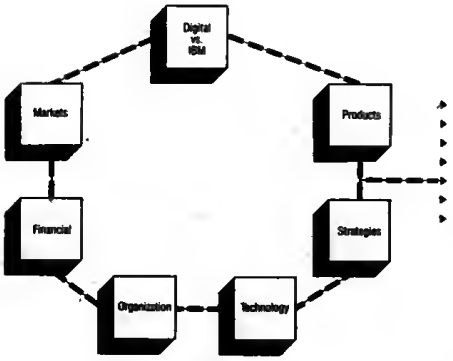

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Program Highlights

Day 1

Introduction and Commentary
J. Carl Masi, IDC Chariman & CEO

Keynote Address Robert C. Hughes, V.P., Digital Equipment Corp.

Digital's Evolution Bob Randolph, Director, DEC Advisory Service, IDC

Digital's Competitive Environment
Dave Moschella, V.P., IDC

Digital and the Desktop
Aaron Goldberg, V.P., IDC

DEC's Network-Based Strategy
Kim Myhre, V.P., IDC

DEC: Leasing Opportunity and Perspective
Dave Harmon, President, El Camino Resources Ltd.

Day 2

Digital and Technology
Will Zachman, Corp. V.P., IDC

Digital: The Prognosis
John Levinson, V.P., Goldman Sachs & Company

IBM vs. DEC Frank Gens, V.P., IDC

Digital in Manufacturing
Adam Zais, Director, IDC

User Panel: Digital User Perspective
Moderator Patrick Kenealy, President, *Digital News*

Vendor Panel: Competitive Industry Dynamics
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Ken Cunzeman,
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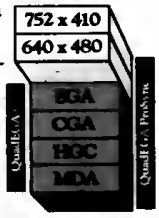

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Turning business data into charts and graphs is now easy. What's hard is making the images convey what you mean.

THE PROMISE OF PICTURES

BY JOEL ORR

ANTHONY RUSSO

The role of graphics in business is currently undergoing a major transition as translation of facts and figures into visual images becomes less of a mechanical task and more of an automated process. At this point, business graphics software can do almost everything a graphic artist can do by hand, and it can do it faster and with greater variety of formats. Text charts, for example, which currently represent the type of business graphics used most often, can be created more easily than typed memos and reformatted with the click of a mouse for overhead transparencies, 35mm slides or paper. This level of facility was not acquired overnight. It required about 15 years to capture these skills in code and consolidate them in packages that are both affordable and accessible.

Until recently, only the most expensive business computer graphics software — such as the $30,000 Tell-A-Graf package for large IBM mainframes, originally from Integrated Software Systems Corp., which was recently acquired by Computer Associates International, Inc. — could replicate the typographic qualities of manual work or even produce acceptable stylized arrows, pointers and pictorial embellishments to standard pie, bar and line charts.

Now, however, products such as Freelance Plus from Lotus Development Corp. in Cambridge, Mass., which has a price tag of $495, and the $695 35mm Express from Business & Professional Software, Inc., also based in Cambridge, do all of that and more — on personal computers that sell for $3,000. The cost of hard-copy output has also dropped off sharply, especially for the occasional user.

Hewlett-Packard Co., the leader in quality multiple-pen plotters, now offers desktop models for less than $2,000 that interface easily to personal computers. In the same price range, Xerox Corp. provides a color ink-jet plotter that produces both paper copies and transparencies. For slightly more money, Calcomp in Sunnyvale, Calif., offers a thermal-transfer unit called the Colormaster, which provides 200 dot/in. output on paper or transparencies. This $4,000 printer comes with a cut-sheet feeder and a variety of standard interfaces, including RS-232 and the Centronics parallel port. Software drivers for the leading graph packages are included in the base price.

A few years ago, users could obtain almost any business graphics feature they desired, but not in a single package. For example, they could get freehand drawing, but not in the same package that produced high-quality typography. Today, many programs provide most of the features users seek, and selection is often based on the support of specific pieces of hardware, ease of use and price.

Perhaps even more important than the breakthroughs in affordability and ease of use, however, is the fact that computer graphics systems have reached levels of performance necessary to

Orr, a speaker and author on graphics, heads Orr Associates, Inc., a computer graphics consulting firm in Great Falls, Va. He is a founder of the National Computer Graphics Association.

Graphics

FROM PREVIOUS PAGE

make business graphics palatable for business executives.

A recent article in *The Wall Street Journal* notes that computers churned out more than 3 billion sheets of hard copy in the U.S. last year — 1,500 sheets for every man, woman and child in the country. It is a fact that more computer-generated data is being produced than can possibly be assimilated, but graphics can aid in the digestive process. Marvin Patterson, an analyst with Hewlett-Packard in San Diego, Calif., reports that while we absorb verbal and numeric information at up to 1,200 words per minute, we are capable of taking in pictorial data at a rate equivalent to 50 million words per minute. Graphics can therefore help us deal with the quantity of information with which we are bombarded.

In 1986, computer-generated images accounted for only 10% of the $15 billion spent on visual presentation materials, a small showing that Doug Neal, executive vice-president of DRC, a Washington, D.C., systems house, attributes to now-rectified performance deficiencies in graphics systems. "There are certain minimal levels of responsiveness, resolution and color that important buyers — senior and upper-middle executives — demand," he says. When those critical limits aren't met, these professionals aren't interested.

The big news this year is that those performance requirements can be satisfied with off-the-shelf components. According to Neal, Compaq Computer Corp.'a Compaq 386 "draws complex and colorful charts in under two seconds, while IBM Enhanced Graphics Adapter boards provide the minimum required resolution with 16 or more colors." Such developments, Neal contends, will lead to much greater use of graphics at the executive level.

Putting it on the PC

Personal computers have had a great impact on business graphics, and their influence is bound to increase as these machines become more powerful and the graphics software written for them becomes more capable. In fact, some people consider PCa to be already capable of supplanting mainframes for graphics applications. "Everything that can be done on a mainframe," says Morris Samit, a Framingham, Mass., computer graphics consultant, "can also be done on a micro."

There are, however, some gaps remaining and some arguments for keeping the graphics applications within the mainframe environment.

Richard Dym, executive vice-president of Interchart Software, Inc. in Princeton, N.J., says, "Ideally, we should get to a point where the user doesn't care whether he'a on PC or mainframe. But data links aren't there yet: There are no fully functional programs for automatically extracting data from all data bases. And mainframe companies still don't understand the user interface issues. I think the next hot product will be an expert system that helps users use the vast graphics power that is now at their fingertips."

Alan Paller, president of AUI /Computer Associates, a computer graphics consulting and training firm in Arlington, Va., adds that for large organizations, centralized graphics on mainframes are usually less expensive, more flexible and easier to control.

"Producing a pie chart on an IBM Personal Computer with a desktop HP plotter is fun and almost easy," Paller says. "But producing 150 charts on that system is almost impossible." Besides, he adds, production-quality graphics in large quantities require expensive output devices and trained operators, and these are difficult to provide to the PC user, except by means of a centralized facility associated with a large computer.

Space agency solution

There are ways to achieve production quality without sacrificing the convenience of business graphics capability at the PC level, as is demonstrated at the National Aeronautics and Space Administration headquarters in Washington, D.C. NASA installed extensive centralized graphics facilities as part of a comprehensive office automation plan. Two Digital Equipment Corp. VAX-11/780 computers run Tell-A-Graf and DEC'a All-In-1 to support a network that ties together terminals and PCs on the desks of virtually all knowledge workers, from clerks and secretaries to executives.

David Lavery and Cathy Sonnek of Planning Research Corp., a consulting and engineering firm in Washington, D.C., who worked with NASA to create the system, report that All-In-1 has been enhanced to permit users to generate graphics with low-quality output devices. If they want high-quality graphics, they send the chart or graph with a message to a graphic artist over the network. The artist does not have to rekey the chart but can simply enhance it and output it on one of the spooling slide-makers also connected to the VAXs through the network.

The term "business graphics" covers a broad range of resolution and artistic quality. At the top of the spectrum is business graphics as defined by graphic arts professionals who expect high resolution, multiple colors, professional layout and the ability to produce slides, transparencies and paper output. These charts and graphs are used for boardroom presentations, television and newspapers.

This user is served by systems such as those offered by Genigraphics, Inc., based in Liverpool, N.Y., Management Graphics, Inc. in Minneapolis and Cubicomp Corp. in Hayward, Calif.

These systems are based on specialized graphics processors and displays and dedicated minis and micros. Mainframe-based packages, such as Tell-A-Graf and Precision Visuals, Inc.'a Grafmaker, are used by artists and nonartists, under the tutelage of MIS's graphics experts.

An increasingly important category is made up of systems that run generic micros, including systems such as IBM'a PC Storyboard and Time Arts, Inc.'s Lumena. These systems are aimed at not only graphic artists but also talented nonprofessionals. They can be used to produce high-quality presentation graphics with the appropriate output devices, but they

Continued on page S8

Graphics tips

- Concentrate on summary data, not details.
- Don't use more than five slices in a pie chart.
- Don't have more than seven bars in a bar or column chart.
- When making 35mm slides, the text is too small if you can't read it without magnification on the slide itself.
- Use either a portrait or landscape orientation, not both.
- Don't use underlining for emphasis; instead, use italics, upper-case letters or — sparingly — bold-face type.
- Graphic artists can mix typefaces nicely; the rest of us should stick to a single typeface in a presentation. If your equipment allows it, change sizes for headings.
- Use solid colors to fill graph areas; avoid patterns.
- Black backgrounds make slides and viewgraphs easier to read.
- Use only key words on text charts, not entire sentences.
- If you have to apologize when the slide comes on the screen, don't use that slide.

JOEL ORR

Cutting a big graphics chore down to size

Andy Andraczke, *senior systems specialist at Tenneco*

BY ROSEMARY HAMILTON

In 1986, the six operating divisions of Houston-based Tenneco Oil and Gas Co. coordinated twice-yearly budget proposals, a task that involved outside contractors and more than 50 people per division, many of whom worked overtime to produce the extensive reports, each of which was supported by an average of 400 graphs and charts.

This year, Tenneco'a divisions again face the massive reporting chore, but it is expected to be a much easier and much less expensive project, according to senior systems specialist Andy Andraczke. The divisions are using a mainframe graphics software package to complete their budget reports, and, based on the experience of the first budget project that used the software, future efforts will require fewer people, no overtime and no outside contractors.

Business graphics software is not new to Tenneco, which has been using SAS Institute, Inc.'a SAS/Graph and Tell-A-Graf — originally from Integrated Software Systems Corp., which was recently acquired by Computer Associates International, Inc. — at its headquarters for statistical analysis and economic planning, Andraczke says. But the installation of Uniras, Inc. software, however, marks the first time end users have interacted with and directly benefited from graphics software, he says, excluding isolated cases of Lotus Development Corp. 1-2-3 usage.

The late 1986 budget presentation prepared by the Lafayette, La., division, which served as a first test site for the Uniras graphics software, netted many positive results. According to Andraczke, this division used about 50 people for each of the two yearly projects. With Uniras, that group was cut to between 30 and 40 employees, none of whom worked overtime.

The software, with a Tektronix, Inc. 4692 ink-jet printer, enabled users to produce all the graphics as hard copy. In fact, Andraczke says, the savings resulting from fewer staff people, no overtime and no contractors paid for the two $18,000 Tektronix printers.

Uniras was chosen in early 1986 for divisional use over two other packages, including Tell-A-Graf software. The software was required to meet two criteria: It had to operate in a mainframe environment and be as user friendly as possible. All three of the packages ran on mainframes, but Uniras, unlike the other two, is menu driven. This, Andraczke says, allows nonprogrammers to easily follow the steps required to run an application. "We wanted to have a package that everybody could use," he says, "Users don't want to learn how to run it. They want a tool. And they're not responsible for the software; they're responsible for production."

Tenneco chose mainframe software instead of a micro-based system primarily because of budget restraints, Andraczke says. "When the cost of oil went down, we had a pretty big budget crunch," he explains. "Since we already had pretty powerful systems, it was easier to cut all expenses on the personal computer end. We have a big PC base, but we are not buying new ones right now, and we're not buying much software for them."

Andraczke says micros are used for some graphics applications, such as the creation of charts with 1-2-3. However, he says "there is no general graphics package used throughout the company." The Uniras software will be running under the IBM VM operating system on the 4361s, which are installed at each of the divisions. •

Hamilton is a *Computerworld* staff writer.

INTERVIEW
DRAWING ON THE PC

Carl Machover is president of White Plains, N.Y.-based Machover Associates Corp., a consulting firm he founded in 1976 to provide management, engineering, marketing and financial services to computer graphics users and vendors. He is also an adjunct professor of computer graphics at Rensselaer Polytechnic Institute in Troy, N.Y., and a member of the advisory board of the Pratt Center for Computer Graphics in Design.

Recently, Machover spoke with *Computerworld* Associate Editor Penny Janzen about this rapidly emerging industry.

What have been the most significant technical breakthroughs in business graphics software in the past few years?
Well, both the quality of the imagery that has become available and the versatility of the software running on relatively small resources have really been astonishing. Those advances, combined with the recent availability of some equipment capable of producing good-quality hardcopy output, have been very important.

Do you see any roadblocks to further progress at any level — personal computer through mainframe — in graphics software development?
My feeling is that the roadblocks are probably not in the hardware or the software. The roadblocks really are attitudinal ones on the part of the users. I think that there still are portions of our business community that are just not comfortable with graphics and are still a little more comfortable with numbers.

I also think there is some concern still about the fact that the presentation of business data using graphics has not been standardized, so that the idea of being able to distort information may cause problems.

Is user reluctance responsible for the relatively low penetration of computer graphics in business?
Certainly that's one issue. The other issue is that, until recently, the stuff has been a little hard to use. Some of the current crop is much better, and, of course, one of the things that has helped to broaden use is that it is increasingly possible to go back to your data bases and use data base information for graphics instead of rekeying it.

One of the things we're seeing that may help to move the user community is that some of the very large software houses that have been involved in the numeric side of business are beginning to reach out and buy up some of the major graphics companies.

The few examples we had of such combinations in the past were notably unsuccessful. But Lotus Development Corp. seems to have done a far better job than others did in the past of promoting the graphics side, especially the Freelance package, which was part of Graphic Communications. So I'm more optimistic about these being successful.

How far have we come in systems integration, in terms of ability to download data from the mainframe data bases to create graphics on micros?
I would say that most of the suppliers of business graphics have that kind of capability to one degree or another. Some of it is easy and some of it is hard, but if you had asked me that same question four years ago, I would have said then that no one had the capability. So I think there's been major progress in that direction.

Do you see graphics eventually becoming the sole province of the PC?
I think that the personal computer is growing so powerful that to void it and to void its intelligence doesn't make sense. On the other hand, I think for very large companies the mainframe still represents the repository of the data.

So, what I would expect to happen is that the mainframe will remain the repository of the data, and what will be sent to the PC will be essentially a description of the form in which the data is to be presented. As PCs become more intelligent, that description may simply be a description that says, "Put this in a pie chart or put this in a bar chart." All the handling to generate that chart will be done within the PC.

What changes do you see taking place in large systems graphics software in response to the growth in interest in PC graphics?
Well, I think you see it right now. I think the large systems people are buying up the small systems vendors. Every vendor of what was essentially mainframe-based software has a PC option associated with it. I think that's without exception.

What do you see happening to the minicomputer market as a result of the increased micro-to-mainframe link usage?
It's awfully hard to see very much future for them. And again — what do these words mean? The problem is that the things we used to define as minis are now being accomplished beautifully as personal computers. I understand that Dataquest, Inc. has tried to use a division of the size of the CPU to determine if it's a personal computer or a mini. They say that a PC is a 16-bit machine and a mini is a 32-bit machine. If that's true, there will soon be no PCs.

Are there any functionalities currently missing from business graphics software that you feel need to be addressed?
I think there's an opportunity for what people might describe as expert systems. There still is a substantial amount of judgment required by the user to come up with reasonably good graphics.

Some efforts have been made to overcome that by having template kinds of things in which the user selects from some preformed graphs. But there is very little that helps the user understand the best way to plot the kind of data he has or the best kind of presentation for what needs to be done.

For example, if I'm going to make a business chart that I'm going to show as a slide, I'm going to have to have a much simpler image than if I were going to put that same piece of information as a graph in a report.

There's no software today that lets you press a button to indicate, "this is going to be a slide" and "that's going to be a chart." There is software now that says, "Do you want spring colors or autumn colors?" but there's no software that says, "What you have is a time series, and therefore the sort of chart you need is this." So I think there's some very real opportunities to help the user achieve professional-level quality in the way the charting is done.

ALAN WITSCHONKE

Carl Machover

What, if any, effect will the emergence of an Intel Corp. 80386 hardware standard have on business graphics?
I think that it will be somewhat less important in the business graphics area than in the engineering and scientific area.

One way that the increased power and capacity may impact business graphics, however, is in allowing greater movement of images. Business graphics are normally perceived as being very static. I put up a chart, I put up another chart. Well, there may be a lot of applications in which what I'd really like to look at is a three-dimensional representation of the data and to move that three-dimensional representation so I can look at it from different points of view. When we get resources like the 386 — which make it easier to think about real-time manipulation of those images — I think that's going to lead to some of that kind of capability ●

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DIAL-INQ READER SERVICE NUMBER 29

Mixed forecast for business graphics

The Management Graphics Project has been operating at the University of Minnesota in Minneapolis since summer 1983 under the sponsorship of Integrated Software Systems Corp., which was recently acquired by Computer Associates International, Inc., 3M Corp., Decision Resources, Inc. and Execucom Systems Corp. Its purpose is to examine the role of graphics as a tool for effective management. The two articles that follow summarize the project's findings regarding the use of computer graphics in organizations and the role of graphics in decision making.

BY JOHN A. LEHMAN

Corporations have been quick to jump on the business graphics bandwagon in the past couple of years, but studies indicate that the momentum may be slowing.

Research recently completed at the University of Minnesota reveals that business graphics use has increased significantly in organizations during the last two years. At the same time, the study indicates that future growth in this area may be slower.

In 1984, more than 200 managers of data processing and information centers were surveyed regarding their use of computer graphics for management applications. At that time, almost 90% of the organizations possessed business graphics capabilities, but most of these were limited and only recently installed.

At that time, almost three-quarters of the respondents reported having few computer graphics workstations, including personal computers with graphics capabilities. At almost half of the organizations, less than 5% of the users had management graphics experience, and at almost three-quarters of the organizations, less than 20% of users had such experience.

Looking to the future, more than 40% of the respondents in 1984 forecast that the use of management graphics would grow greatly during the next few years, while more than 96% forecast at least moderate growth.

In mid-1986, the same respondents were surveyed again, along with an additional matched group consisting of managers and users. The new survey revealed considerable growth in both the number of business graphics workstations in use and those operating them.

On the other hand, forecasts for future growth were reduced, indicating that, given the current technology, the use of business graphics may be reaching saturation in many organizations.

The mean number of business graphics devices in use at organizations has grown considerably (see lower left chart, page S7) with PCs and plotters constituting most of the increase. At the same time, the percentage growth in color graphics terminals is considerable. Most organizations distribute these devices among users rather than centralizing them.

The number of organizations with experienced business graphics users has increased during our study. For example, between the years 1984 and 1986, the percentage of companies reporting less than 5% experienced graphics users decreased from 40% to 25.5%, while the percentage of those reporting 50% to 59% experienced users increased from 3% to 9.4%.

Further, the amount of experience those users report also increased. In 1984, 31.5% reported one year of experience. In 1986, that dropped to 12.6%. The percentage of users reporting five years' experience increased from 8.5% in 1984 to 15.5% in 1986.

In spite of this pool of inexperienced users, forecasts for growth in business graphics technology are somewhat subdued (see upper right chart, page S7). The number of respondents forecasting a great amount of growth has decreased significantly, while a much higher percentage of respondents forecast no growth at all. When respondents were asked to project which areas of business graphics would experience the greatest amount of growth out of oral presentations, written reports, decision support and data analysis, they rated the categories about equally, not a significant change from 1984.

The results of this study regarding growth of business graphics are strengthened by the "1986 Key Information Systems Management Issues" study recently completed by Professor James Wetherbe and James Brancheau at the MIS Research Center of the University of Minnesota. In 1983, this Delphi study ranked computer graphics 19th out of 25 key MIS issues. In the 1986 study, it was ranked 25th. One interpretation of this result is that organizations have been relatively successful in integrating graphics with their information systems, and so success is now taken for granted.

Our study shows a strong growth in business graphics in the last two years, both in terms of technology and number of users. At the same time, it appears the use of business graphics may have reached a plateau. Further growth may require changes in cost, performance or ease of use in the technology. •

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DIAL-INQ READER SERVICE NUMBER 30

Quality graphics design supports quality decisions

BY GARY DICKSON
and JOHN A. LEHMAN

There is little empirical evidence to prove that the use of graphics automatically improves decision making. Research finds that users of graphs outperform users of numerical tables in some tasks but not in others. Differences in performance appear to be influenced by task characteristics, design of graphs and learning effects.

The suitability of graphical representation depends on the decision at hand. Graphs are best used when the tasks involve detecting subtle trend changes over time, comparing pattern changes over time, searching for patterns in large amounts of data or analyzing the relationships among variables. All of these tasks are compatible with the traditional use of graphics as a technique for statistical analysis, whether in time series or modeling.

Tabular data representation, on the other hand, appears to be most suitable when a decision maker needs to read specific data values or determine absolute or percentage changes between two numbers. Nomographs and related techniques of graphical representation may be concise, but they are not as accurate or as fast as tabular presentation for this sort of task, as any ex-users of slide rules will probably remember.

The right graph, appropriately constructed, carries out a considerable effect on the utility of graphics as support for decision making. However, deceptive and poorly designed charts occur frequently in business graphics.

Deceptive graphics design is common. One study found that more than 40% of corporate annual reports contain at least one misleading graph. And research carried out at the University of Minnesota found that charts and graphs with inconsistent scaling, a common method of distortion, yield worse decision performance than do correctly designed charts and graphics.

Poor graphics design is not necessarily the result of an intention to deceive. Improvements in ease of use of computer graphics systems have also contributed to the problem.

At one time, charts and graphs were produced only by graphic artists or statisticians who had received training in representational design. Today, anyone who can operate a personal computer can generate charts and graphs that are mechanically perfect even when their design logic is flawed. The design quality of many of these products is poor. This problem has increased in the last few years with the increase in clip art packages, which enable naive users to create "chart junk" reminiscent of the jumbled profusion of Victorian advertisements.

Even professionals are not immune to errors in design. We have observed presentations by vendors of computer graphics systems in which much more than half of the slides contained major design errors, whether in color, layout or selection of graph type.

The type of chart or graph used makes a difference. Our research indicates that decision makers find clustered bar charts easy to use. This is especially true when the charts use horizontal bars and when data values are included at the end of the bars.

Line charts are preferred to bar charts in which speed of comprehension is important. On the other hand, decision makers have difficulty interpreting pie charts, segmented bars and area charts.

Unlabeled or poorly scaled graphs hinder comprehension. Clashing patterns of cross hatching and poor color choice, such as dark red on a dark blue background, make graphs difficult to read.

Producing quality design

Many user-friendly graphics packages are not set up to produce good graphics design. Deceptive scales are almost universal as defaults, and better scales are often not available.

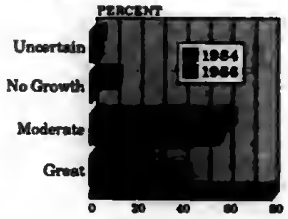
Furthermore, some pen plotters produce colors that are, at best, hard to read. One popular plotter, for example, features light yellow and light orange among its default colors for use on white paper and provides light yellow, light orange and light brown among its transparency pens.

Since most users are not expert at interpreting charts and graphs, some training or practice or both should be provided in the use of business graphics for decision support. Our studies have shown an improvement over time as users learn to use the displays.

Graphics design quality is closely related to decision quality, and users require training and practice before the full benefits of graphical data presentation can be realized. •

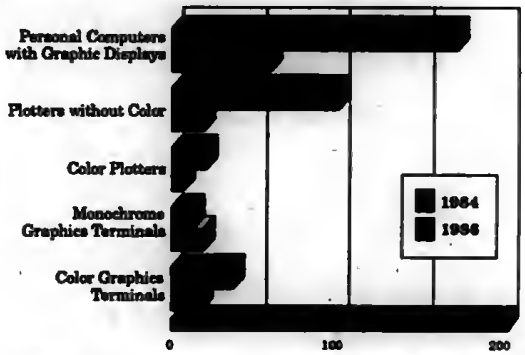
Lehman is an associate professor of MIS at the University of Alaska, Fairbanks; Dickson is president of Group Delta System Sciences in Minneapolis.

Projected growth of applications
User forecasts for spread of business graphics in their organizations



CW CHART

Population of graphics devices in organizations
Mean numbers by type of device



INFORMATION PROVIDED BY UNIVERSITY OF MINNESOTA MANAGEMENT GRAPHICS PROJECT
CW CHART: SUSAN ALDAM

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OUR HERO.

DIAL-INQ READER SERVICE NUMBER 31

Graphics

CONTINUED FROM PAGE S2

run on standard hardware configurations. They can also produce electronic slideshows — sequences of charts that can be displayed like slides in a slide projector — with accompanying wipes, dissolves and other transition effects and even sound on systems that have the suitable hardware.

Also included in this group are products that possess strong data base management capabilities, such as Mirage from Zenographics, and animation packages, such as Macromind's Videoworks for the Apple Computer, Inc. Macintosh, Show Partner from Brightbill-Roberts and Co. and Videowork for the PC from West End Film, Inc.

WHEN executives give presentations, their slides make as much of an impression as their clothes do and reflect the organization they represent. Corporate image should be clearly and consistently presented in the corporation's pronouncements.

Next in line are peer, or management, graphics. These are used by managers in working meetings. Quality of form is not as important as ease of production; the internal graphics of leading PC spreadsheets like Lotus's 1-2-3 and Microsoft Corp.'s Excel fall into this category. Paper and overhead projection transparencies are the main forms of output.

Analytical graphics are at the bottom of the scale. They are designed to be seen only by the person producing them; their most important characteristics are speed of production and flexibility. The statistical routines of SAS from SAS Institute, Inc. in Cary, N.C., and SPSS from SPSS, Inc. based in Chicago, both of which run on mainframes, minis and micros, are often used this way, although these packages are capable of producing the quality required for other applications.

Other important types of business graphics include project management charts, such as those used with PERT, the product management methodology that was developed in 1958 by the U.S. Naval Special Projects Office for planning and monitoring the Polaris submarine project.

Betsy Riley and Stanford Witcher, from Martin Marietta Energy Systems in Oak Ridge, Tenn., used business graphics to reduce from 392 to three the number of man-hours per month spent on PERT project management charts.

The PERT charts were required for monthly presentations made by the Outside Contractors Planning Office at Oak Ridge, which is run by Martin Marietta, to the Department of Energy. Prior to implementing the computer graphics system, data was frozen each month for 10 days before the presentation to the DOE. A staff of seven, mostly engineers, performed the work, and the average number of man-hours spent each month was 392, many of which were overtime hours.

When the DOE demanded more timely data, the contractors planning office was at a loss. They did not possess the budget to add people, and the people on the presentation chart team were already working at capacity.

A project management system, written by in-house programmers and employing some commercial graphics subroutines, saved the division roughly $800,000 during the seven-year life of the project. The system generates slides on film recorders from data on the division's network of DEC VAXs.

With the system in place, the time necessary to produce the charts required by the DOE dropped from 10 days to four, and the number of people required fell from seven to one. And that one person required only three hours to create the charts.

Who's using it?

Business graphics vendors often have difficulty identifying their markets of which there are three: graphic artists, MIS departments and occasional users. All three groups have varying requirements for flexibility and ease of use. Many products try to address two of these or all three and fall short of usefulness in any of them.

Graphic artists need the flexibility of freehand drawing, simple typesetting, accessible clip art and an easy-to-use human interface. They require a system to use as a tool on a regular basis. They will become familiar with it over time, and it must be responsive and consistent.

MIS departments need production tools — software that enables their users to produce presentations quickly and easily and that supports centrally controlled and operated output devices. Seamless interfaces to existing mainframe data bases are also important.

Occasional users make up the fastest growing segment of business graphics users. These are mostly middle managers and executives who need charts from time to time but not regularly enough to warrant their learning a complex charting system.

Occasional users must have tools that are easy to learn and remember, since they are not regularly used. They also need systems that ensure compliance

Continued on page S10

"INFOURMATION" ASCII Printing Within The 3270 Environment Made Possible By 4G Data Systems.

From a leader in micro-to-mainframe link communications, two new products designed to introduce the efficiency and flexibility of ASCII printing to the power of the 3270 environment.

The INFOURMER – our Printer Adapter with a dual personality. One, it interfaces any popular, low-cost ASCII printer to your IBM 3274 controller; and two, it emulates IBM's 3287 printer for mainframe applications.

Now you can tie the same fast ASCII printer into an IBM host, an ASCII host and an IBM PC. All at the same time. Easily and economically.

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Instead, you can perform this function on any low-cost, industry-standard ASCII printer. All it takes is our ***IMAGE*** hooked up between the 3274 controller and your PC's coax cable.

Hard copy of relational information can be printed from mainframe files without heavy CPU time-sharing costs. Also, you can produce immediate screen printouts without interacting with the controller. Up to 10 screens of memory can be stored in a 20K buffer, permitting you to work with the host while the stored screens are being printed.

This new Protocol Converter from 4G represents an inexpensive, viable local ASCII screen print solution for IBM 3270 users.

Again, 4G has the answers to your data communications needs. These two products are a natural extension of the technological support we offer to corporate clients. Not only do they bring ASCII printing to the 3270 environment, but they have a positive bottom-line impact as well. And that's an answer that everyone likes to hear.

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DIAL-INQ READER SERVICE NUMBER 32

PRODUCT FACE-OFF

Considering a general-purpose package from the bottom up

BY BRIAN MCGRATH

MIS management must consider graphics anytime it contemplates the future of end-user computing. It must adopt a strategy to handle the imminent flood tide of demand for graphics from users of all types.

Without a sound foundation at the mainframe level — the toughest and most complex environment — organizations will be swamped by incompatibilities and problems. If the graphics software within an organization is allowed to migrate from the personal computer level, MIS is going to have a serious problem satisfying an end user's distributed processing needs.

Business and statistical graphics packages such as SAS Institute, Inc.'a SAS and SPSS, Inc.'a SPSS are a requirement for any mainframe installation, just as are graphics for PCs. But because of the tremendous impact graphics will induce, it is of the utmost importance to install a general-purpose graphics package as well. By implementing a suitable package on the mainframe, MIS management establishes a set of guidelines for the acquisition of other graphics resources and ensures compatibility and transportability within the organization.

"Suitable" is, of course, a vague term. But it is appropriate here because each of the leading general-purpose mainframe graphics software packages has characteristics that may work for or against it in particular situations. None of the following graphics packages would be the wrong selection. More likely, the wrong selection would be a choice made without consideration of the need for graphics at all levels of computer resources.

The following categories are the most important ones for comparing graphics products:

Usability: The ease with which a product can be used and/or its appropriateness for a particular vertical application can largely determine the user's acceptance of the package.

Transportability: The product's ability to run on — or at least interface with — the mini, or departmental, and micro environments can minimize problems of upload and download compatibility and resource availability.

Applications and utilities: The number of vertical applications and utility packages available for a given graphics base product is important because even if you do not need a certain one today, you can bet you will need it tomorrow.

Enhancement strategy: This is the vendor's approach to staying current with the ever-changing graphics technology; also its relationships with your company's other major vendors, if good, tend to minimize any future compatibility problems.

Support: This involves the extent to which the vendor's support personnel are competent in graphics and are available for special projects or assistance if necessary.

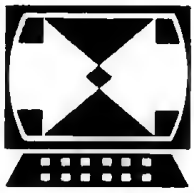
Computer Associates International, Inc., which recently acquired Integrated Software Systems Corp. (Issco), is the leading general-purpose mainframe graphics software vendor, by virtue not only of its product line but also its heavy participation in the graphics industry.

This company has a more extensive line of business graphics software than any other mainframe vendor, and its Tell-A-Plan product, originally an Issco product, is probably the hottest selling vertical application for business. This software for project planning produces excellent Gantt charts and network diagrams.

Vector technology

Another Computer Associates product, Tell-A-Graf, also a former Issco product, is a user-friendly, command-driven interactive system with a complete set of utilities. These include Text for corporate publishing; Cue Chart for a library of charts; Data Connection for extracting input from data files, reports and flat files; Tables for setting up word, number or symbol tables; and Decision Support, a language for arithmetic functions. Disspla, formerly Issco's, is Computer Associates' subroutine-level base product that has additional capabilities for mapping, contouring and three-dimensional presentation.

Tell-A-Graf and Disspla share one negative attribute — both are based on vector technology. When used on a complex layered



graph, the vector technology can become computing intensive due to hidden line removal. Computer Associates also comes up one level short in the important area of transportability. Its products run on mainframes, Digital Equipment Corp.'a VAX and other minis and workstations. Disspla is available for the IBM Personal Computer AT level, but there is some question about whether that version needs code contained in the mainframe version in order to run, or whether the AT software is only sold in combination with the mainframe package.

> GRAPHICS packages are like any productivity tool: Most installations both want and need more than one.

The company'a newly announced Superimage PC-based drawing package provides a partial solution to the issue of transportability.

Issco worked with its customers to develop a wide variety of applications including IVISS Manager, an interactive system that runs under IBM'a ISPF and is panels oriented; Graphics Kernel Systems (GKS) for GKS users; Dynamic, an interactive input system for mouses, light pens and similar devices; and Codebook, which produces commented Fortran source code for compiling.

Issco has historically worked at maintaining an excellent support level. Now, with its acquisition by Computer Associates, the company will have the greatest amount of resources of any independent mainframe graphics software company.

Pansophic Systems, Inc. deserves mention because, as a large software house, it will have an impact on the graphics software marketplace. Pansophic recently acquired the VAX/Unix D-Pict British Petroleum product line and has transported the base products to the IBM mainframe. The D-Pict product line is an excellent one, and, with its recently acquired Starburst line of PC-based presentation graphics, it will be a viable future option. The mainframe product line should be released sometime in the first quarter.

3-D expertise

Precision Visuals, Inc. enjoys the reputation of a competent technical company. Its product success is more at the subroutine level than the stand-alone interactive system, and it stresses the use of devices to their fullest. This means the company codes its device drivers to all the idiosyncrasies and minute capabilities of each device in order to get the most efficient utilization. The payoff is apparent in the splendid interactive support achieved at the terminal level.

There is a need in many installations for modeling or three-dimensional presentations outside of the computer-aided design environment, and this is where Precision Visuals seems to be placing its emphasis and expertise. The company'a mainframe subroutine-level products include DI-3000 for base graphics, Grafmaker for business presentation graphics and DI-3000 XPM for modeling and 3D representations. Picsure, its mainframe interactive system, is somewhat difficult to use because it is command driven, but the company says this will be corrected when Picsure-Plus for the IBM mainframe is released this spring.

In the area of transportability, Precision Visuals is also one level shy. It has migrated its product from the VAX environment to the mainframe, other minis, Unix and some supermicro workstations. What is missing is the PC level. The reason for this, according to the company, is that the complexity of Precision Visuals' software solution currently prohibits a PC version.

Other Precison Visuals products include Addsys-3000 for advanced device-access capabilities, Enter/Act for device independence and a contouring system for surface display. The firm is also active on the Programmer's Heirarchical Interface to Graphics Standard committee, better known as Phigs.

Enhancing trends

The Uniras, Inc. product line is unique among mainframe graphics packages in that it is based on raster technology. A vector-based system produces a complex, layered graph by plotting and, when necessary, removing all lines before overlaying. This is called hidden line removal and can be inefficient and demanding of computer resources. With raster technology, however, no hidden line removal is necessary. Each new layer merely overlays the previous one.

Uniras's product line includes Unigraph, a nonprogrammer, menu-driven, interactive business-graphics package that is as easy to use as any graphics package available. The disadvantage of Unigraph is that it lacks the depth of functionality offered by other business graphics packages, a problem shared at a subroutine level by other Uniras business graphics products. This problem will be solved as the number of Uniras business graphics users increase.

Uniras also offers the only completely transportable corporate solution. All Uniras products run on mainframes, VAXs and other minis, workstations and at the PC AT level. The PC AT version is not a separate software package acquired by Uniras but the same mainframe package with the same user instructions. This transportability includes both the nonprogrammer interactive systems and those at the subroutine level.

Cross-level products

Uniras has an extensive line of products, including Unigraph, Uniedit and Unimap at the nonprogrammer interactive level, and subroutine-level products including Geopak, Geoint, Gimage and Seispak for mapping and contouring; Raspak, Raspak-CAD and Gimage for modeling and imaging; and Bizpak and Bizmap for business.

The enhancement strategy of Uniras is in sync with the current trends in the graphics industry. Color and raster output devices are rapidly gaining ground in the graphics marketplace, and raster-based Uniras software has received acclaim for the quality of its hard-copy color capabilities.

Uniras has formal relationships with most hardware vendors, but the most interesting one is with IBM. IBM markets the Uniras products within its RT Personal Computer line.

Uniras customers rate the company's technical support and assistance as excellent. Though a small company, it has a high ratio of technical support personnel to sales personnel.

Graphics packages are like report writers or any other productivity tool: Most installations both want and need more than one. The payback from graphics software used within individual user departments will be high enough to justify the acquisition of any of these packages. A multivendor software environment is, in fact, the norm for graphics software, and MIS departments can buy all of the systems mentioned for less than the price of one major code generator package. •

McGrath is founder of McGrath and Associates in Plano, Texas, which consults on software selection for corporate MIS installations and performs market research analysis.

Business graphics software

COMPANY	PRODUCT NAME	RUNS ON (OPERATING SYSTEM)	DECISION SUPPORT OR PRESENTATION	NUMBER OF GRAPHS/CHARTS	COMMAND OR MENU DRIVEN	ANIMATION CAPABILITY	ACCEPTS FILES FROM OTHER SOFTWARE	NUMBER OF COLORS	NUMBER OF FONTS (TYPEFACES)	NUMBER OF READY-MADE IMAGES	EGA COMPATIBLE	TYPES OF OUTPUT	HARD COPY OUTPUT DEVICES SUPPORTED	BASE PRICE	READER SERVICE NUMBER
Access Technology, Inc. (617) 655-9191	20/20	MS-DOS, Unix, VAX/VMS, AOS/VS, Prime, VS	Decision support	12	Menu	No	Yes	8	—	None	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$500 - $12,000	680
AD&P Analysis Design & Programming (703) 790-9433	Color*Graph	MS-DOS, Xenix, Unix, Primos	Presentation	8	Menu	No	Yes	8	24	None	NA	Hard copy	Plotter	$3,000	681
Adobe Systems, Inc. (415) 852-0271	Adobe Illustrator	Macintosh	Presentation	Unltd.	Menu	No	Yes	1	120	15	Yes	Hard copy	Ink jet, laser	$495	682
Advanced Graphics Software, Inc. (408) 749-8620	Slidewrite Plus	MS-DOS	Presentation	10	Menu	No	Yes	7	8	101	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser	$345	683
Advanced Technology Center (212) 568-9118	Plot It	PC-DOS	Presentation	35	Command	No	Yes	10	8	35	Yes	Hard copy, slides, video	Dot matrix, ink jet, thermal, laser, plotter	$550	684
AGS Management Systems, Inc. (215) 265-1550	PAC Management Graphics	IBM mainframes, DEC VAX	Both	5	Both	No	No	8	1	5	NA	Hard copy	Dot matrix, plotter	$13,000	685
Alphasoft (213) 212-7477	First	IBM Series/1	Both	8	Menu	No	Yes	8	1	None	NA	Hard copy	Plotter	$1,000	686
Alternate View Corp. (716) 223-4880	Image	Primos	Both	4	Menu	No	Yes	8	9	27	Yes	Hard copy, slides	Dot matrix, thermal, laser, plotter	$6,000 - $37,000	687
Analytical Software, Inc. (214) 340-2564	Boardroom Graphics	MS-DOS	Both	12	Menu	No	Yes	8	4	9	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$150	688
Analyzx International, Inc. (617) 641-0400	Monografx	MS-DOS	—	4	Menu	No	Yes	1	3	12	Yes	Hard copy	Dot matrix, laser	$99.95	689
Apache Electronics Graphics, Inc. (312) 990-7712	Ax Omnigraphics	CP/M, MP/M, MS-DOS, PC-DOS	Both	15	Both	Yes	Yes	Device dependent	6	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, thermal, laser, plotter	$7,000	690

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

Graphics

CONTINUED FROM PAGE S8

with corporate color and form standards for presentations.

Many of these users also need what Professor John Rockart of MIT calls "exploratory graphics" — charting and graphing tools that are easily applied to data, allowing the user to explore the data's nature.

A recent breakthrough product in this arena is Macspin, a Macintosh-compatible package from D2 Software, Inc. in Austin, Texas. Macspin accepts multidimensional data and allows the user to select any three factors for defining points in space. It displays the data as clusters of points in three-dimensional space, with or without a 3-D axis symbol. Analysis is performed interactively by rotating the cloud of points and visually searching for patterns. Rotation motion is smooth and is defined by the user. Any point can be interrogated by touching it with the cursor, which then displays the identified text.

Consultant Samit emphasizes the importance of corporate graphics standards. When executives give presentations, their slides make as much of an impression as their clothes do and reflect the organization they represent. Corporate image should be clearly and consistently presented in the corporation's pronouncements.

Many of the new business graphics systems simplify this by allowing the user to create templates. These are fill-in-the-blanks charts that are laid out and designed to conform to corporate standards. The user simply adds data, and the template formats it into professional-looking graphics output in keeping with the corporate image. The Genigraphics, Inc. Graftime package for personal computers provides this capability, as do most mainframe- and mini-based systems.

Here today, hot tomorrow

Some system features longed for by early users of business graphics are now commonplace. The often-expressed wish for automatic charts and graphs from spreadsheets and other applications has been satisfied. Lotus's 1-2-3, Microsoft's Excel, Provue Development Corp.'s Overvue and other spreadsheets and data base packages offer integral charting.

Furthermore, many successful micro-based graphing packages accept 1-2-3 files as input; Interchart Software, Inc.'s Chartbuster/PC — billed by its vendor as "Tell-A-Graf for the PC" — imports spreadsheets and retains their appearance along with their menu.

PC business-graphics packages that do well with both text and graphics, such as Business & Professional Software's 35mm Express, Interchart's Chartbuster/PC and Computer Associates' Superimage, are the growth products for this year. They can produce both documentation and presentations and are more useful than combinations of single-use packages.

Professor Edward Tufte of Yale University writes, "There's something wrong with computer graphics. Too much chart junk. No sense of visual craft!"

> "THERE'S something wrong with computer graphics. Too much chart junk. No sense of visual craft!"
>
> EDWARD TUFTE
> YALE UNIVERSITY

As our definition of computer literacy matures and we stop teaching programming to business majors, we should find time and resources to make Graphics 101 just as important as English 101. We do not all need to become graphic artists, just as we do not all need to become writers. But what we do need is to grasp the basics of design and graphic communication.

For instance, 20 years ago, psychologist George Miller published a monograph called, "The Magic Number Seven, Plus or Minus Two." In it, he discussed experiments showing that people cannot deal with more than about seven items at a time. This piece of information is invaluable in the design of text and pie charts: If the charts contain more than seven items, they are probably too difficult for an audience to follow.

Colored to suit

Color is another important area of graphics education for the nonartistic professional. Color has meaning that varies by context; to accountants, for instance, red usually means bad news. Presentations can have disastrous results when such connotations are ignored.

Anders Vinberg, a vice-president at Issco, now a part of Computer Associates International, speaks of the need for "layout intelligence," or built-in processes for ensuring that the layout of the chart or graph is suited to both the medium and the desired results. Some systems, for example, change letter thickness and line spacing for 35mm slides and overhead projection transparencies.

However, Darryl Huff's classic, *How to Lie with Statistics*, has yet to influence the features of any business graphics system. Users can still produce deceptive charts, often without realizing they are doing so. A common mistake is setting the vertical origin at a number other than zero and not explicitly informing the viewer. This can have the effect of smoothing or exaggerating the graph.

The big picture

Several years ago, a meeting was held in Seattle. Its title was, "Why is Computer Graphics Always a Year Away?" Pictorial communications have long excited those with an inkling of their power. The old saying suggesting the number of words a picture is worth has earned cliche status because of its broad applicability.

While the widespread application of business computer graphics may still be "a year away," the concept of graphics is now broadly accepted; computers are expected to produce graphics. Although the use and creation of charts and graphics is still not taught to business majors, such pictures are now an important component of most business proposals.

We are becoming aware of the communication power of computer-generated pictures. But, as is true of all languages, comprehension and appreciation are only the first steps toward achieving fluency. •

COMPANY	PRODUCT NAME	RUNS ON (OPERATING SYSTEM)	DECISION SUPPORT OR PRESENTATION	NUMBER OF GRAPHS/CHARTS	COMMAND OR MENU DRIVEN	ANIMATION CAPABILITY	ACCEPTS FILES FROM OTHER SOFTWARE	NUMBER OF COLORS	NUMBER OF FONTS (TYPEFACES)	NUMBER OF READY-MADE IMAGES	EGA COMPATIBLE	TYPES OF OUTPUT	HARD COPY OUTPUT DEVICES SUPPORTED	BASE PRICE	READER SERVICE NUMBER
Arene Applied Electromagnetics, Inc. (800) 882-4428	Presentation Graphics by Arene	MS-DOS, Unix, MPE	Both	30	Both	No	Yes	8	18	None	Yes	Hard copy, slides	Thermal, ink jet, laser, plotter	Under $500 - $8,000	691
Artech Software, Inc. (703) 860-3085	Highlight	MS-DOS	Both	NA	Menu	Yes	Yes	16	—	80	Yes	Hard copy, slides	Dot matrix, ink jet, laser	$99.95	692
	Freeform	MS-DOS	Presentation	NA	Menu	Yes	Yes	16	9	80	Yes	Hard copy, slides	Dot matrix, ink jet, laser	$149.95	
Artronics, Inc. (201) 736-6858	Slideware	MS-DOS	Presentation	17	Both	No	Yes	256	15	36	Yes	Hard copy, slides	Thermal, laser	$2,000	693
	Chart	MS-DOS	Presentation	17	Both	No	Yes	256	15	36	No	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$7,800	
Ashton-Tate (203) 222-1974	Chart-Master	MS-DOS	Presentation	9	Menu	No	Yes	6	7	94	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$375	694
	Sign-Master	MS-DOS	Presentation	Unltd.	Menu	No	No	6	7	94	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$245	
	Diagram-Master	MS-DOS	Presentation	3	Menu	No	No	8	7	195	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$345	
	Map-Master	MS-DOS	Presentation	Unltd.	Menu	No	Yes	9	7	94	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$395	
AT&T Information Systems (800) 247-1212	AT&T PC Business Graphics	Unix	Presentation	5	Both	No	Yes	1	1	None	NA	Hard copy	Dot matrix, ink jet, plotter	$195	695
Autographix, Inc. (800) 258-4357	Autographix Slide	MS-DOS	Presentation	7	Menu	No	Yes	4	5	72	Yes	Hard copy, slides	Dot matrix, laser	$249	696
	Autographix 35	MS-DOS	Presentation	7	Menu	No	Yes	4	5	72	Yes	Hard copy, slides	Dot matrix, laser	$895	
Astek, Inc. (714) 770-8406	PCartist	MS-DOS	Presentation	—	Menu	No	No	128	28	None	No	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	Contact vendor	697
	PCchart	MS-DOS	Presentation	50	Both	No	Yes	16	1	50	No	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$695	
Batteries Included (416) 881-9941	B/Graph	Atari 130XE, 800XL, 800; Apple operating systems	Both	5	Command	No	Yes	9	2	None	No	Hard copy	Dot matrix, laser	$39.95	698
	Portfolio	Macintosh, MS-DOS, PC-DOS	Both	2	Menu	No	Yes	1	1	None	Yes	Hard copy	Dot matrix, laser	$199.95 - $249.95	
Beagle Bros, Inc. (619) 296-6400	Triple-Dump	DOS 3.3, PRODOS	Presentation	NA	Both	No	Yes	1	None	None	No	Hard copy	Dot matrix, ink jet, thermal	$39.95	699
	Frame-Up	DOS 3.3	Presentation	NA	Menu	No	Yes	6	None	None	No	Slides	—	$29.50	
Bell and Howell Co. Quintar Division (213) 320-5700	Slide Port	MS-DOS 2.0	Both	6	Command	No	Yes	16	20	NA	Yes	Slides	NA	Contact vendor	700
Benchmark Software (800) 821-1908	Benchmark Graphics	MS-DOS	Both	4	Both	Yes	No	6	15	None	Yes	Hard copy	Dot matrix, thermal, ink jet, laser, plotter	$199	701
Brightbill-Roberts and Co. (315) 474-3400	Show Partner	MS-DOS	Presentation	None	Menu	Yes	Yes	16	20	75	Yes	Hard copy, slides, video	Dot matrix, ink jet, thermal, laser	$79	702
Business & Professional Software, Inc. (800) DIALBPS	35mm Express	MS-DOS	Presentation	9	Menu	Yes	Yes	64	20	200	Yes	Hard copy, slides	Dot matrix, ink jet, thermal, laser	$995	703
	Overhead Express	MS-DOS	Presentation	None	Command	Yes	Yes	6	4	100	No	Hard copy	Dot matrix, ink jet, thermal, laser	$195	
BV Engineering (714) 781-0252	PCPlot3	MS-DOS	Presentation	5	Menu	No	Yes	1	1	1	—	Hard copy	Dot matrix, ink jet, plotter	$95	704
	PDP	MS-DOS, CP/M 80	Presentation	1	Menu	No	Yes	1	1	1	—	Hard copy	Dot matrix, ink jet, plotter	$72.95	
Calcomp (800) CALCOMP	Image 1	MS-DOS	Presentation	8	Menu	No	Yes	16	9	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet	$495	705
CE Software (515) 224-1995	Mock Package Plus/Mockchart	Macintosh	Both	5	Menu	No	Yes	None	Unltd.	None	No	Hard copy	Dot matrix, laser	$35	706
Chang Laboratories, Inc. (800) 831-8080 in Calif. (800) 972-8800 outside Calif.	Graphplan	MS-DOS	Both	6	Menu	No	Yes	6	6	None	Yes	Hard copy, slides	Dot matrix, laser, plotter, ink jet	$295	707
Cognos Corp. (800) 4-COGNOS	Powerhouse Graphics	MPE	Presentation	15	Command	No	Yes	Device depen-dent	Device depen-dent	NA	No	Hard copy, video	Any HP printer, plotter	Contact vendor	708
Collins & Associates (415) 571-6991	Plot It	H-P Basic	Both	6	Menu	No	Yes	1	1	80	No	Hard copy, video	Dot matrix, plotter	$185	709
Commodity Systems, Inc. (800) 327-0175	Quickplot	Apple-DOS, MS-DOS, C-64 DOS	Decision support	10	Menu	No	No	Device depen-dent	1	None	Yes	Hard copy	Dot matrix	$150	710
Communication Dynamics, Inc. (503) 684-5151	Sound Presentation	MS-DOS	Presentation	NA	Menu	No	Yes	6	7	350	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$300	711

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Communication Dynamics, Inc.	Timeplace	MS-DOS	Presentation	19	Menu	No	No	8	2	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$495	
Computer Associates International, Inc. (Isaco) (619) 452-0170	Tell-A-Graf	Unix, VAX/VMS, VM/CMS, MVS	Both	6	Both	No	Yes	Device dependent	16	1,300	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$6,500 - $24,000	712
	Super Image	MS-DOS	Presentation	NA	Menu	Yes	Yes	Device, dependent	4	100	Hard copy, slides	Yes	Dot matrix, thermal, ink jet, laser, plotter	$495	
Computer Support Corp. (214) 661-8960	Diagraph	MS-DOS	Presentation	NA	Menu	No	No	9	65	2,200	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$395	713
	Picture Perfect	MS-DOS	Both	7	Menu	No	Yes	9	13	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$295	
Convergent Technologies, Inc. (408) 434-2848	Art Designer	CTOS, BTOS	Presentation	7	Menu	No	Yes	8	5	75	NA	Hard copy	Dot matrix, laser, plotter	$350	714
CPT Corp. (612) 937-8000	EZ Graph	Proprietary	Presentation	4	Menu	No	Yes	6	8	None	NA	Hard copy	Dot matrix, laser, plotter	$100.	715
Cricket Software, Inc. (215) 251-9690	Cricket Graph	Macintosh	Both	11	Both	No	Yes	NA	Unltd.	None	No	Hard copy, slides	Plotter, laser, dot matrix	$195	716
Cullinet Software, Inc. (617) 329-7700	Goldengate	MS-DOS	Both	16	Both	No	Yes	16	1	None	Yes	Hard copy	Dot matrix, laser	$695	717
Data Business Vision, Inc. (619) 450-1557	Graffhopper	MS-DOS, CTOS, Xenix, Uma	Both	101	Both	No	Yes	16	7	101	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$295	718
	GDSS	MS-DOS, CTOS	Both	101	Both	No	Yes	16	7	101	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$795	
	Private Eye	MS-DOS, CTOS	Both	101	Both	No	Yes	16	7	None	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, plotter	$99	
Data Consulting Group (415) 883-2300	Data*Easy PC Employee Scheduler	MS-DOS	Presentation	4	Both	No	No	6	1	4	—	Hard copy	Dot matrix, laser	$75	719
	Data*Easy PC Project Scheduler	MS-DOS	Presentation	4	Both	No	No	6	1	4	—	Hard copy	Dot matrix, laser	$75	
Data Ease International, Inc. (800) 243-5123	Graftalk	MS-DOS	Both	14	Both	No	No	4	4	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$350 - $400	720
Data General Corp. (617) 366-8911	Trendview	MS-DOS (via CEO), Graphics Display Terminals	Both	4	Both	No	Yes	4	12	40	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$320 - $2,250	721
	CEO Drawing Board	MS-DOS, Graphics Display Terminals	Presentation	—	Both	No	Yes	4	12	40	Yes	Hard copy, slides	Dot matrix, laser, plotter	$1,000 - $4,950	
Data Processing Design, Inc. (800) 843-1317 outside Calif.	Graphics 11	VMS	Presentation	20	Both	No	Yes	8	10	50+	NA	Hard copy, slides	Dot matrix, laser, plotter	$3,500	722
	IB Graph	VMS, RSTS	Both	4	Both	No	Yes	8	9	None	NA	Hard copy, slides	Dot matrix, laser, plotter	$3,500	
Decision Graphics (303) 796-0341	DGI Sign Maker	DOS 3.3, PC-DOS, MS-DOS 2.1 and higher	Presentation	NA	Menu	No	Yes	16	2	None	—	Hard copy	Plotter	$75	723
	DGI Type Shop	DOS 3.3, PC-DOS, MS-DOS 2.1 and higher	Presentation	NA	Menu	No	Yes	16	4	None	—	Hard copy	Plotter	$175	
Decision Resources Corp. (202) 223-5555	Graphics Production Manager	VM/CMS, MVS/TSO, MS-DOS	NA	NA	Both	No	Yes	Device dependent	Device dependent	None	Yes	Hard copy, slides, video	ink jet, laser	$30,000	724
Dialogue, Inc. (212) 425-2665	Analect DSS Graphics	VM/CMS, MVS, VAX/VMS, Prime, Unix	Both	6	Command	Yes	Yes	Device dependent	40	None	NA	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$3,000 - $35,000	725
Dicomed Corp. (800) 342-6633	Presenter PC	MS-DOS	Presentation	12	Menu	No	Yes	64	2	None	Yes	Hard copy, slides, video	Dot matrix, thermal, laser	$995	726
Digital Equipment Corp. (800) DIGITAL	Decalide	VAX/VMS	Presentation	6	Both	No	No	8	3	None	No	Hard copy, slides, video	Dot matrix, ink jet, laser	$1,500	727
	Decgraph	VAX/VMS	Both	6	Both	No	Yes	6	6	6	No	Hard copy, slides, video	Dot matrix, ink jet, laser	$1,500	
Digital Research, Inc. (800) 443-4200	GEM Draw Plus	MS-DOS	Presentation	NA	Menu	No	Yes	8	2	43	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$299	728
	GEM Wordchart	MS-DOS	Presentation	9	Menu	No	Yes	16	2	9	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$149	
	GEM Graph	MS-DOS	Presentation	12	Menu	No	Yes	8	4	—	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$249	
Dynacomp, Inc. (716) 671-6160	OSGraph	CP/M	Presentation	4	Menu	No	Yes	NA	1	24	NA	Hard copy, slides	Dot matrix	$69.95	729
EDC Software, Inc. (617) 749-1794	Graphic Impact A	Wang VS	Both	15-20	Menu	No	Yes	Device dependent	50	76	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$6,000	730
	Graphic Impact 6	All Wang operating systems	Both	20	Both	No	Yes	Device dependent	Device dependent	100	Yes	Hard copy, slides	Dot matrix, laser, plotter	$3,950 - $20,000	

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Electronic Data Systems Corp. (301) 231-6256	Graphics	TOPS	Both	18	Command	No	Yes	NA	10	None	No	Hard copy, slides	Dot matrix, thermal, plotter	$10,000	731
Enertronics Research, Inc. (800) 325-0174	Energraphics	MS-DOS	Presentation	0	Menu	No	Yes	16	7	300	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$595	732
E Soft Enterprises Ltd./IO Design (800) 241-2122	Color Chart	Macintosh	Both	100+	Both	No	Yes	NA	9	2	No	Hard copy	Dot matrix, laser	$39.95	733
Execucom Systems Corp. (800) 531-5038	Impressionist	MVS, VM/CMS, VAX/VMS, Primos	Presentation	17	Both	No	Yes	Device dependent	0	100	Yes	Hard copy, slides	Dot matrix, laser, ink jet, thermal, plotter	$995	734
Forest Microsystems, Inc. (703) 841-0800	Encore	MS-DOS	Decision support	11	Both	No	Yes	4	1	None	No	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$475	735
Ficor (513) 771-4466	Autograph	Unix	Presentation	10	Both	No	Yes	0	2	20	NA	Hard copy, slides	Dot matrix, laser, plotter	$695 - $6,995	736
Fox & Geller, Inc. (201) 794-8883	Dgraph for Dbase	MS-DOS	Presentation	4	Menu	No	Yes	12	1	None	Yes	Hard copy, video	Dot matrix, laser, plotter	$295	737
	Rgraph for Rbase	MS-DOS	Presentation	4	Menu	No	Yes	12	1	None	Yes	Hard copy, video	Dot matrix, laser, plotter	$300	
Gantt Systems, Inc. (201) 968-9550	Gantt-Pack	MS-DOS	Presentation	0	Both	No	No	3	1	0	No	Hard copy	Dot matrix, ink jet	$225	738
General Parametrics Corp. (415) 534-3950	Picture It	Proprietary, MS-DOS	Presentation	20	Menu	No	Yes	1,000	0	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, thermal, laser	$700	739
Genigraphics, Inc. (315) 451-6600	Graftime	MS-DOS	Presentation	14	Menu	No	No	20	4	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$395	740
Genographic, Inc. (215) 925-6000	Graphix 11	VAX/VMS, PDP-11	Decision support	4	Both	No	Yes	5	1	None	NA	Hard copy	Dot matrix, plotter	$1,095 - $2,995	741
Golden Software, Inc. (800) 972-1021	Grapher	MS-DOS	Presentation	10	Both	No	Yes	16	17	None	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$199	742
	Surfer	MS-DOS	Both	7	Both	No	Yes	10	17	None	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$399	
Graphic Information Systems Technology, Inc. (212) 662-0263	DAFS	VM/CMS, MVS/ISO, Prime, Unix, VAX/VMS, MS-DOS	Presentation	Unltd.	Both	Yes	Yes	Device dependent	5	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	Contact vendor	743
	BGS	VMS/CMS, MVS/ISO, Prime, Unix, VAX/VMS, MS-DOS	Decision support	Unltd.	Command	No	No	Device dependent	Device dependent	None	Yes	Hard copy	Dot matrix, ink jet, laser, thermal, plotter	Contact vendor	
Graphic M*I*S, Inc. (312) 786-1330	Fingraph II	MS-DOS	Presentation	—	Menu	No	Yes	—	—	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$795	744
	Speechmaster	MS-DOS	Presentation	NA	Menu	No	No	NA	0	100+	No	Hard copy	Dot matrix, plotter	$70	
Graphic Software Systems, Inc. (503) 641-2200	GSS*CHART	MS-DOS, Unix	Both	9	Menu	No	Yes	Unltd.	0	0	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$295	745
	GSS*Flottalk	MS-DOS, Unix	Both	0	Command	No	Yes	Unltd.	3	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$295	
Graphicus (Graphic User Systems, Inc.) (408) 246-9530	Grafit	HP-Unix, RTE	Both	20	Command	No	Yes	10	14	20+	NA	Hard copy	Laser, plotter	$1,200 - $7,800	746
Graphware, Inc. (513) 434-6733	Charts Unlimited	MS-DOS	Presentation	NA	Both	No	Yes	1	1	50	No	Hard copy	Dot matrix, thermal, ink jet, laser	$395	747
Grid Systems Corp. (800) 222-GRID	Gridpaint	Proprietary, MS-DOS	Presentation	NA	Command	No	Yes	2	15	30	No	Hard copy	Dot matrix, ink jet, laser, plotter	$200	748
	Drawit	HP-Unix, RTE	Both	NA	Menu	No	Yes	10	14	1,000	NA	Hard copy	Laser, plotter	$1,100 - $6,900	
Hewlett-Packard Co. (800) 367-4772	HP Graphics Gallery	MS-DOS	Presentation	3	Menu	No	Yes	0	17	60-1,000	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$295 - $695	749
	HP Draw	HP 3000, MPE	Presentation	7	Menu	No	Yes	—	31	500+	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$2,000 - $5,200	
Honeywell Information Systems, Inc. (800) 328-5111	Onegraph	DPS 6, DPS 6 Plus, MS-DOS	Both	9	Both	No	Yes	0	7	None	Yes	Hard copy, slides	Dot matrix, laser, plotter	$1,145 and up	750
IBM (201) 333-5674	Graphical Data Display Manager	MVS, VM, VSE	Presentation	5	Both	No	Yes	64	63	None	NA	Hard copy	Dot matrix, thermal, laser plotter	$120 - $600/month	751
Information Builders, Inc. (212) 736-4433	Focus	MS-DOS, Wang VS, Unix, VAX/VMS, VM/CMS, MVS, DOS, CICS	Both	5	Both	No	Yes	Device dependent	—	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$1,295 - $74,500	752
Information Processing Techniques, Corp. (415) 494-7500	Exhibit	VAX/VMS, VM/CMS, MVS/TSO, DOS/VSE	Presentation	7	Both	No	Yes	8	12	12	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$900 - $3,000	753
Inner Loop Software (213) 822-2800	Boxes and Arrows	MS-DOS, PC-DOS Version 2	Both	1	Menu	No	Yes	16	1	None	Yes	Hard copy	Dot matrix, laser	$395	754

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Innovative Software, Inc. (913) 469-3000	Smart Spreadsheet with Graphics	MS-DOS, Unix	Presentation	9	Menu	No	Yes	16	11	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$495	755
Interactive Systems Corp. (303) 797-9800	AGIS	VAX/VMS	Both	4	Both	No	Yes	Device dependent	5	7	No	Hard copy	Dot matrix, ink jet, laser, plotter	$57,000 - $125,000	756
Interactive Systems and Software, Inc. (617) 744-6708	EZChart	VAX/VMS, PDP-11, RT-11, RSX-11-M, RST S/E	Both	6	Command	No	Yes	Device dependent	1	None	No	Hard copy	Dot matrix, ink jet, laser, plotter	$1,795	757
Interchart Software, Inc. (609) 987-1590	Chartbuster/PC	MS-DOS	Presentation	9	Menu	No	Yes	8	8	26	Yes	Hard copy	Dot matrix, ink jet, plotter	$750	758
International Financial Data Systems, Inc. (404) 256-6447	Graphics Presentation System	MS-DOS	Presentation	11	Menu	No	Yes	—	—	34	No	Hard copy	Dot matrix, thermal, ink jet, laser, plotter	$750 - $1,000	759
IPT Corp. (415) 494-7500	Exhibit	VMS, Unix, AOS/VS, AOS, EM/RDOS	Presentation	12	Both	No	Yes	Device dependent	16	12	No	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	$900 - $3,000	760
Kinetic Software (502) 585-3403	Kinetic Graphics System	PC-DOS	Presentation	Unltd.	Menu	No	Yes	225	10	80	Yes	Hard copy, slides, video	Dot matrix, thermal, laser, plotter	$695	761
Laticorp, Inc. (415) 543-1199	High Tech Business Graphics	MS-DOS, Xenix, Unix	Decision support	4	Menu	No	Yes	1	2	None	Yes	Hard copy	Dot matrix, laser, plotter	$195 - $4,995	762
LCS/Telegraphics (617) 547-4738	Telepaint	MS-DOS, PC-DOS	Both	NA	Menu	No	Yes	4	16	20	No	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$69	763
Logicon, Inc. (402) 291-7750	Jgraph	Unix, VM, MVS	Both	15	Both	No	Yes	256	25	100	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$20,000 - $50,000	764
Lotus Development Corp. (617) 577-8500	Freelance Plus	MS-DOS	Presentation	5	Menu	No	Yes	13	58	500+	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$495	765
	Graphwriter	MS-DOS	Presentation	23	Menu	No	Yes	13	22	None	No	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$495	
Maddison-Cross Associates, Inc. (213) 387-4044	Artpack	MS-DOS	Presentation	3	Menu	Yes	Yes	4	39	179	Yes	Hard copy, slides, video	Dot matrix, ink jet, laser, plotter	$100	766
McDonnell Douglas Information Systems Group (714) 250-1000	Realgraph	Proprietary	Both	6	Command	No	Yes	Device dependent	Device dependent	None	Yes	Hard copy, slides, video	Dot matrix, laser, thermal, plotter	$995	767
John McLean and Associates, Inc. (713) 780-7262	Optichart	HP 3000, VAX/VMS	Both	5	Menu	No	Yes	8	12	None	NA	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$2,500	768
Media Cybernetics, Inc. (800) 426-HALO	Nimbus	MS-DOS	Presentation	12	Menu	No	Yes	256	18	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$195	769
	Dr. Halo II	MS-DOS	Presentation	NA	Menu	Yes	Yes	256	20	NA	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser	$139.95	
Megatek Corp. (619) 457-5359	Contemplate	VAX/VMS, VM/CMS	Decision support	7	Command	Yes	Yes	Device dependent	37	None	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$3,750 - $25,000	770
Micrografx, Inc. (800) 272-3729	Windows Draw	MS-DOS	Presentation	NA	Menu	No	Yes	8	7	500+	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$299	771
	Windows Graph	MS-DOS	Presentation	7	Menu	No	Yes	8	7	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$395	
Micro-Labs, Inc. (214) 702-8654	Bizgraph	TRSDOS	Both	8	Menu	No	Yes	1	1	—	No	Hard copy	Dot matrix	$75	772
Microsoft Corp. (206) 882-8080	Microsoft Chart	MS-DOS	Presentation	8	Command	No	Yes	16	12	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, laser, plotter	$295	773
	Microsoft Excel	Macintosh	Both	8	Both	No	Yes	1	Device dependent	None	NA	Hard copy	Dot matrix, laser	$395	
	Microsoft Chart for Macintosh	Macintosh	Both	8	Both	No	Yes	1	—	None	NA	Hard copy	—	$125	
Micro Software Systems, Micro-Plot, Inc. (714) 526-8435	Datagraph	TRSDOS, LDOS, NEWDOS	Both	7	Menu	No	Yes	—	—	20	No	Hard copy	Dot matrix	$80 - $115	774
Microsystems Engineering Corp. (312) 882-0111	Mass-11 Draw	MS-DOS	Presentation	NA	Menu	No	Yes	1	1	17	Yes	Hard copy	Dot matrix, laser, plotter	$495	775
Miracle Computing (913) 843-5863	Graphcalc	MS-DOS, PC-DOS	Presentation	7	Both	No	Yes	16	1	None	No	Hard copy	Plotter	$475	778
	Graphit	MS-DOS, PC-DOS	Presentation	5	Both	No	No	16	1	None	No	Hard copy	Dot matrix	$80	
	Eazygraph	MS-DOS, PC-DOS	Presentation	3	Both	No	No	16	1	None	No	Hard copy	Dot matrix	$35	
Mosaic Software, Inc. (617) 491-2434	Chartman	MS-DOS	Both	18	Menu	No	Yes	8	8	18	Yes	Hard copy	Dot matrix, plotter	$99	777
	Twin	MS-DOS	Presentation	8	Menu	No	Yes	8	11	18	Yes	Hard copy	Dot matrix, laser, plotter	$99	
Multiware, Inc. (916) 956-3291	MGSP	RT-11 TSX, RSX-11-M, VM	Both	4	Command	No	Yes	12	14	20	No	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	$1,500	778

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Mathware, Inc.	Bender	RT-11 TSX, RSX-11-M, VM	Both	4	Command	No	Yes	12	14	10	No	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	$800	
Muse Software Co. (301) 831-7090	Data Plot	Apple II family	Both	4	Menu	No	No	6	1	2	No	Hard copy	Dot matrix	$35.97	779
New England Software, Inc. (203) 625-0062	Graph-in-the-Box	MS-DOS	Presentation	13	Menu	No	Yes	16	2	None	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$97.60 - $147.80	780
Pacific Basin Graphics (415) 824-4910	PBG 200 Business Graphics	Unix, MS-DOS	Presentation	7	Menu	No	Yes	16	3	NA	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$295 - $750	781
	PBG 300 Business Graphics	Unix, MS-DOS	Presentation	10	Menu	No	Yes	16	3	NA	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$295 - $995	
Panasphic Systems, Inc. (800) 323-7335	D-Plot	VAX/VMS, MVS/TSO, VM/CMS, Prime 19, AOS/VS (MV)	Both	21	Both	No	Yes	72	44	140	NA	Hard copy, slides	Dot matrix, thermal, ink jet, plotter	$500 - $37,500	782
Parallax Systems, Inc. (212) 475-4001	Execuplot	VM/CMS	Both	6	Menu	No	Yes	6	1	None	Yes	Hard copy	Dot matrix, ink jet, laser, thermal, plotter	$5,000	783
PCSoftware of San Diego (619) 571-0981	Executive Picture Show	MS-DOS	Presentation	Y	Both	Yes	Yes	4	11	250	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$345	784
Petrocomp Systems, Inc. (713) 880-0226	Pegs	PC-DOS	Both	1	Menu	No	Yes	16	1	None	Yes	Hard copy, slides, video	Dot matrix, laser, plotter	$295 - $595	785
Pilot Executive Software, Inc. (617) 350-7035	Command Center	VAX/VMS, VM/CMS	Decision support	1,000	Menu	No	Yes	6	—	50	Yes	Hard copy, slides	Ink jet, laser	$75,000 - $135,000	786
	The Pilot Advantage	VM/CMS	Decision support	1,000	Menu	No	Yes	8	—	50	Yes	Hard copy, slides	Ink jet, laser	$15,000	
Pinstripe Software Ltd. (703) 790-8488	Wallstreet Window	MS-DOS, PC-DOS	Both	1	Menu	No	Yes	Device dependent	Device dependent	None	Yes	Hard copy, slides	Dot matrix, laser, ink jet	$295	787
Practicorp International (617) 965-9870	Practigraph	MS-DOS	Both	6	Menu	No	Yes	16	6	None	No	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$99.95	788
Precision Visuals, Inc. (303) 530-9000	Picsure Plus	VAX/VMS, Unix, VM/CMS	Both	14	Both	No	Yes	Device dependent	50	None	NA	Hard copy, slides, video	Ink jet, laser, plotter	$6,600 - $52,000	789
Primesoft Corp. (301) 229-4229	Prime Plotter	Apple IIc	Both	13	Menu	Yes	Yes	8	4	40	No	Hard copy, slides, video	Dot matrix, plotter	$340	790
Progressive Peripherals and Software, Inc. (303) 825-4144	Add Graph	MS-DOS	Presentation	12	Menu	No	Yes	4	1	4	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$146.95	791
Pyxel Applications (804) 320-5572	Pyxel Visuals	PC-DOS	Presentation	1	Menu	No	No	1	2	None	Yes	Hard copy	Dot matrix, laser	$98	792
Quadratron Systems, Inc. (818) 789-8588	Q-Chart	Unix, MS-DOS	Presentation	6	Menu	No	Yes	6	6	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$325 - $7,000	793
Samna Corp. (800) 831-9679	Samna Decision Graphics	MS-DOS	Both	7	Menu	No	Yes	Device dependent	16	12	Yes	Hard copy, slides, video	Plotter	$450	794
SAS Institute, Inc. (919) 467-8000	SAS/Graph	OS, CMS, DOS/VSE, VMS	Both	23	Both	No	Yes	256	61	130	Yes	Hard copy, slides, video	Plotter, ink jet, laser	$1,500 - $10,000	795
Saturn Systems, Inc. (800) 328-6145	Saturn Graph	VAX	Both	6	Menu	No	Yes	8	12	None	No	Hard copy, slides	Dot matrix, thermal, laser, plotter	$2,000 - $10,000	796
Sensible Software, Inc. (313) 258-5566	Graphics Department	Apple II	Both	6	Both	No	Yes	6	40	None	No	Hard copy, video	Dot matrix	$124 95	797
I. P. Sharp and Associates, Ltd. (416) 364-5361	Superplot	MVS	Both	14	Both	No	Yes	Device dependent	12	14	NA	Hard copy	Dot matrix, thermal, ink jet, laser, plotter	$30,000	798
Ship Analytics (203) 535-0990	Athena/graph	DEC VAX	Presentation	4	Menu	No	Yes	6	4	2	NA	Hard copy, slides, video	Dot matrix, plotter	$450 - $1,400	799
Softel, Inc. (212) 677-6599	Videogram	MS-DOS	Presentation	NA	Menu	Yes	No	64	43	NA	Yes	Hard copy, slides	Dot matrix, thermal, ink jet	$50	800
Softkey Software Products, Inc. (416) 598-5033	Key Chart Y 4.6	MS-DOS	Both	14	Menu	No	Yes	16	6	None	Yes	Hard copy, slides, video	Dot matrix, laser, thermal, ink jet, plotter	$149 - $375	801
Softrak Systems (801) 531-8550	Protrak	PC-DOS, Unix, Xenix, VAX/VMS, Ultrix	Both	2	Menu	No	Yes	6	2	NA	Yes	Hard copy	Dot matrix, ink jet, laser, thermal, plotter	$295	802
	Multi Gantt	PC-DOS, Unix, Xenix, VAX/VMS, Ultrix	Both	2	Menu	No	Yes	6	2	NA	Yes	Hard copy	Dot matrix, laser, ink jet, thermal, plotter	$195	
	Custom Gantt	PC-DOS, Unix, Xenix, VAX/VMS, Ultrix	Both	1	Menu	No	Yes	6	2	NA	Yes	Hard copy	Dot matrix, laser, ink jet, thermal, plotter	$95	
Software Clearinghouse (513) 451-6950	Graphstation	MS-DOS	Both	6	Menu	No	Yes	Device dependent	6	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, thermal, laser, plotter	$495	803

COMPANY	PRODUCT NAME	RUNS ON (OPERATING SYSTEM)	DECISION SUPPORT OR PRESENTATION	NUMBER OF GRAPHS/CHARTS	COMMAND OR MENU DRIVEN	ANIMATION CAPABILITY	ACCEPTS FILES FROM OTHER SOFTWARE	NUMBER OF COLORS	NUMBER OF FONTS (TYPEFACES)	NUMBER OF READY-MADE IMAGES	EGA COMPATIBLE	TYPES OF OUTPUT	HARD COPY OUTPUT DEVICES SUPPORTED	BASE PRICE	READER SERVICE NUMBER
[illegible] (800) 621-7000 in Calif. (800) 382-3311 outside Calif.	Spreadsheet Access	MS-DOS	Both	11	Menu	No	Yes	16	1	None	Yes	Hard copy	Dot matrix, thermal, ink jet, laser, plotter	$295	804
Software Publishing Corp. (415) 962-8910	Harvard Presentation Graphics	MS-DOS	Presentation	3	Menu	No	Yes	Device dependent	5	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	$395	805
	PFS Professional Plan	MS-DOS	Both	13	Menu	No	Yes	Device dependent	4	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$249	
Southwind Software, Inc. (318) 534-9160	Grafmate	Unix	Both	14	Menu	No	Yes	9	50+	Device dependent	No	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	Contact vendor	806
SPSS, Inc. (312) 329-3500	SPSS Graphics	VAX/VMS, Primos, GCOS, VM/CMS, MVS AOS/VS	Presentation	25	Menu	No	Yes	8	14	5	NA	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$3,000 - $12,000	807
Stansfield & Associates (818) 840-0150	P and RC	MS-DOS, PC-DOS	Both	2	Menu	No	No	NA	Device dependent	None	No	Hard copy	Dot matrix	$295	808
Stella Systems (408) 257-5644	Stella Business Graphics	IBM PC	Presentation	12	Menu	No	Yes	8	1	9	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$199	809
STSC, Inc. (301) 984-5000	Stsgraphics	MS-DOS	Both	250+	Both	No	Yes	18	1	None	Yes	Hard copy, slides, video	Dot matrix, plotter	$795	810
Sunie Software (312) 824-5154	The Whole Kaboodle	MS-DOS, PC-DOS	Both	2	Menu	No	Yes	1	1	None	No	Hard copy	Dot matrix, ink jet, laser, thermal	$129.95	811
Talus Software Products (213) 450-9404	Business Pitcvision	Macintosh	Presentation	NA	Menu	Yes	Yes	1	18	NA	NA	Hard copy	Dot matrix, ink jet, laser	$395	812
Trillian Computer Corp. (408) 358-2761	The Trillian Demo Generator	MS-DOS	Presentation	NA	Command	Yes	Yes	4	Unltd.	None	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser	$6,800 (for first license)	813
Unitrex, Inc. (714) 980-1000	Unigraph	VAX/VMS, VM/CMS, PC-DOS	Both	18+	Menu	No	No	Device dependent	33	18	Yes	Hard copy, slides	Dot matrix, ink jet, laser, thermal, plotter	$1,500 - $40,000	814
Unisys Corp. Contact local sales office	The Business Graphics Package	BTOS	Both	3	Menu	No	Yes	8	Device dependent	NA	No	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$500	815
	BTOS Systems Draw	BTOS	Both	NA	Menu	No	Yes	8	Device dependent	NA	No	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$250	
Vectorama, Inc. (617) 661-1230	Prelude Graphic Module	Unix	Both	8	Command	No	No	Device dependent	1	None	Yes	Hard copy	Dot matrix, laser, ink jet, plotter	$300	816
Viking Software Services, Inc. (918) 745-6550	Viking Graphic System	VAX/VMS	Decision support	3	NA	No	Yes	1	1	None	No	Video	None	$500	817
Visible Systems Corp. (617) 380-1000	Visible Analyst	MS-DOS, PC-DOS	Both	10	Menu	No	No	1	7	40	Yes	Hard copy	Dot matrix, laser, ink jet	$595	818
Visual Communications Network, Inc. (817) 497-4000	Concorde	MS-DOS	Presentation	8	Menu	Yes	Yes	16	17	3,000	Yes	Hard copy, slides, video	Dot matrix, ink jet, laser, plotter	$695	819
Visual Engineering, Inc. (408) 945-9055	Visual Prochart	Unix	Both	15	Menu	No	Yes	8	8	8	No	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	$500 - $1,000	820
Visual Intelligence Corp. (413) 253-3482	Data Views	VMS, Unix, AEGIS, Ultrix	Presentation	25	Both	Yes	Yes	Device dependent	Device dependent	NA	No	Hard copy	Plotter	$7,700	821
Wang Laboratories, Inc. (800) 225-9264	VS Graphics Facility	VS	Both	6	Both	No	Yes	8	15	NA	NA	Hard copy	Dot matrix, laser, plotter	$3,500	822
	Charter	VS	Both	8	Both	No	Yes	1	8	NA	NA	Hard copy	Dot matrix, laser, plotter	$3,500	
	Microsoft Chart	MS-DOS	Both	8	Command	No	Yes	5	—	NA	NA	Hard copy	Dot matrix, ink jet, laser, thermal, plotter	$1,250	
Zenographics (714) 851-6352	Mirage	MS-DOS, PC-DOS	Both	20	Both	No	Yes	256	7	150	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$895	823
	Autumn	MS-DOS, PC-DOS	Both	8	Menu	No	Yes	256	7	150	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$595	
	VR	MS-DOS, PC-DOS	Presentation	NA	Menu	No	Yes	256	2	NA	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser	$195	
ZSoft Corp. (404) 980-1950	PC Paintbrush	MS-DOS, PC-DOS	Both	NA	Menu	No	Yes	Device dependent	15	4	Yes	Hard copy	Dot matrix, ink jet, thermal, plotter	$95	824
	Paintbrush Plus	MS-DOS, PC-DOS	Both	NA	Menu	No	Yes	Device dependent	18	4	Yes	Hard copy	Dot matrix, laser, thermal, ink jet, plotter	$149	
	Paintbrush Designer Series	MS-DOS, PC-DOS	Both	NA	Menu	Yes	Yes	Device dependent	50	4	Yes	Hard copy	Dot matrix, ink jet, thermal, laser, plotter	$259	

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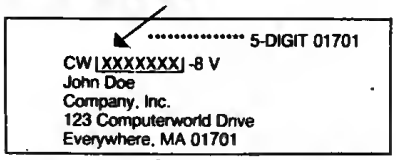

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DIAL-INQ READER SERVICE NUMBER 33

Roulette, IBM-style

Will IBM convert all its mid-range customers to 370s, merge System/36 with System/38 or support CPF on the 9370? Users, place your bets.

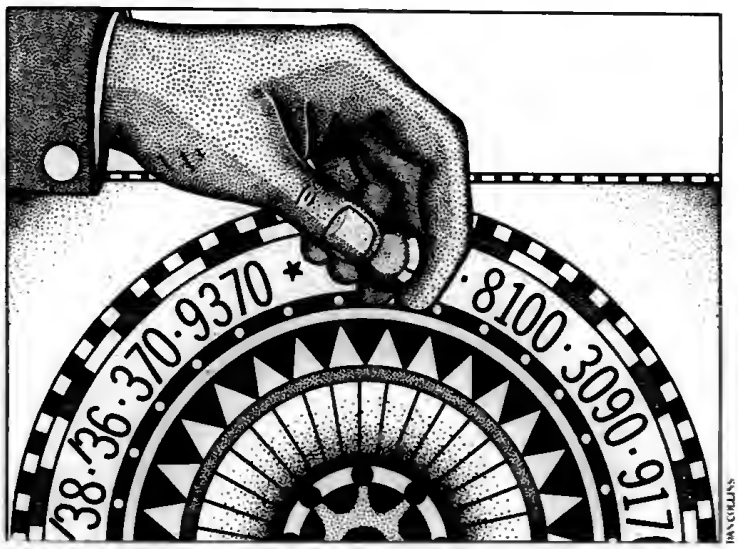
BY MICHAEL SICILIAN

In mid-February, IBM announced several new products that reveal a little more of its mid-range strategy. It released System/36 hardware enhancements. It proclaimed the benefits of the Solutionpac Office Series, a version of Displaywrite repackaged with common electronic mail and office automation utilities for the System/36 and the 9370. And it reported an extension of Distributed Data Base Management (DDM), a remote file-access method, to the Personal Computer.

IBM also restated its belief that no single architecture is sufficient for its large user community. The company said it will continue to enhance three general-purpose systems — the 370, System/36 and 38 — and three special-purpose systems — the RT Personal Computer, System/88 and Series/1.

These announcements follow a downturn in IBM's financial performance, as well as criticism of lack of compatibility and networking support among its products, sluggish growth in the mainframe systems market, loss of market share in PCs and entry systems, plus record financial and technical achievements by its largest mid-range system competitor, Digital Equipment Corp.

DP managers, market analysts and not a few pundits must now evaluate the importance of these events, predict their near-term impact on the industry and prepare for the longer term evolution of IBM's mid-range strategy as well as the likely response from major competitors. To do this, we need to ask ourselves: How did IBM get into this situation? Is it reasonable for the company to continue indefinite support of so many architectures? What alternatives does IBM face throughout the next few years?



Sicilian is director of information systems and a vice-president of a major insurance brokerage firm.

Paying the penalty

In the early 1980s, IBM switched its marketing strategy from leasing to sales, thus creating a three- to five-year surge in revenue. We should all have predicted the decline in growth rate that occurred once the installed base of leased equipment sold. Yet many spoke as if good financial results were a given for IBM because of its dominant market position.

IBM is also paying the penalty for artificially partitioning its product offerings. The company divided its mainframe customers into DOS and OS/MVS camps. It developed an elegant time-sharing system, VM/CMS, and then failed to deliver reasonable file sharing. It split off the System/34s, 36s and 38s from 360/20s, 370/115s and 4300s to position itself for a possible antitrust breakup and because mainframe software was so hard to use. The company still has not addressed this problem of unfriendly software for mainframe customers. It marketed 8100s rather than small 4300s to distribute access to mainframe systems.

To maintain account control, IBM encouraged customers to build machine- and operating system-dependent applications. This policy backfired. IBM customers not only find it difficult to move to competing systems, as IBM hoped, but they are constrained from moving to newer, better supported or larger IBM products as well.

In the late 1970s, IBM canceled the technically successful Future Systems project because it could not move its 370 customer base to a new system. This failure should have provided fair warning, but IBM management could only see the immediate threat from Amdahl Corp.

IBM's strategy of multiple architectures increased the cost and delayed the introduction of PC-to-mainframe communications because separate hardware and software products were required for the 370, System/36 and 38, 8100 and Series/1 machines. This strategy is also the source of IBM's current difficulties with mid-range systems that lack an integrated environment of networked machines with distributed data bases and cost-competitive hardware and software.

IBM would like to justify this multiplicity of systems. Indeed, the company has just restated its position that customers need the

- **IBM pays price for off-base 1970s' strategy**
- **Customers blocked from upgrading**
- **Will all users be forced into XA architecture?**

special benefits that differentiate the 370 from the System/36 or 38. Yet, in order to compete effectively with DEC, IBM must promise distributed processing, transferable applications and easy upward migration paths, all of which are difficult to achieve with multiple architectures and differing user and application program interfaces.

The announcement of Solutionpac for the System/36 and 9370 is primarily symbolic. It appears to be IBM's attempt to show that its users can be insulated from differing architectures. However, most computers do not run just IBM office automation systems. It is unlikely that IBM's strategy can insulate its customers' application programs to the point of allowing a transfer to larger machines when upgrades are required.

THE SYSTEM/36 architecture, like DEC's old PDP-8 and PDP-11, has essentially reached the end of its useful life, since it does not provide a foundation for building applications that must grow during the next several years.

IBM's decision to enlarge some models of the System/36 and continue support for multiple architectures will ease some customers' fears and protect the company's current cash flow. On the other hand, the decision to support DDM on PCs holds much greater strategic importance. Application development under CICS requires expensive programming talent, and mainframe systems yield much less programmer productivity than microcomputers or minis.

DDM/PC will allow customers to ignore CICS and the mainframe except as a data base server and batch processing back end. All interactive program development can be transferred to PCs, thus eliminating a major bottleneck for mainframe DP shops.

For the short run, IBM has decided to play it safe and continue business as usual. However, most of its customers are working on applications that will be in production for the next five to 10 years. They must be able to anticipate IBM's longer range strategy.

This requires consideration of the following alternatives, which appear to be the most likely, given IBM's current product mix and available technology:

- Upgrade current hardware and software.
- Convert all customers to 370 architecture.
- Merge System/36 and 38.
- Produce a "9360" and "9380."
- Support CPF on the 370.

Upgrade current hardware and software. IBM could try to ignore the issue of multiple architectures and continue to upgrade current System/36 and 38 hardware and software in accordance with its stated policies. Most customers have not yet tried to connect System/36s and 38s and 370s into a network, and many will never need this capability. Few companies need to move applications from machine to machine or serve multiple architectures from a single programming group. These users need a growth path and improved networking among multiple System/36s or multiple 38s.

Since 1979, when IBM first delivered the System/38, it has enhanced system performance four times. All of these enhancements were provided by installation of new CPU cards as field upgrades.

There is a rumor that IBM will continue this approach this year by announcing a new System/38 Model 800 or 900 with twice the speed of a Model 700. If this strategy is continued, it will be limited primarily by the physical constraints of the card cage that contains the System/38 CPU, its memory and I/O controllers. IBM will be able to provide further system upgrades only as integrated circuit technology permits higher levels of performance within the same physical configuration.

For the System/36, IBM has built a variety of processors, so these physical limits do not apply. When IBM announced the latest round of System/36 improvements, many argued that this move proved System/36s are not obsolete because they can still be used productively and because IBM continues to enhance the system.

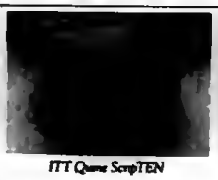
However, the System/36's 16-bit software architecture does not support performance improvements when applied to larger, more complex system and application programs. The System/36 architecture, like the Hewlett-Packard Co. HP 3000 and DEC's old PDP-8 and PDP-11, has essentially reached the end of its useful life, since it does not provide a foundation for building applications that must grow during the next several years.

Upgrading current hardware and software would be attractive to IBM's customers. Any company that just bought a Model 700 would not feel abandoned, because the 700 could be upgraded to a Model 800 or 900 next year. Companies with large investments in System/36 and 38 applications would be protected and would see an upgrade path.

On the other hand, the physical layout of the System/38 — mainframe, card cage, power supplies, I/O channels and so on — was designed in the 1970s and cannot go on forever.

The System/36 and 38 do not use floor space as efficiently as the new 9370, and the 38's CPU planer board cannot

QMS-PS 800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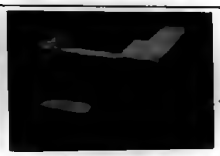
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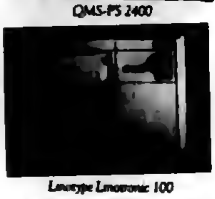
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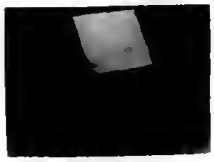
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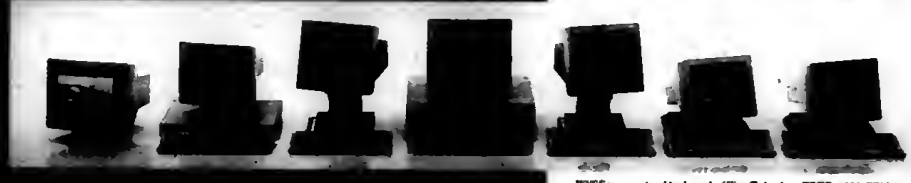

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support the new thermal conduction module that is the basis of the 9370's performance.

Convert all customers to 370 architecture. In theory, IBM could abandon the System/36 and 38 and try to move its entire customer base to 370 machines. Some mainframe advocates predicted this, following announcement of the 9370-series hardware. The 9370 provides CPU speeds of 0.5 to 2.8 million instructions per second (MIPS), whereas the System/38 covers the range of 0.3 to 1.3 MIPS, and the System/36 covers 0.1 to 0.5 MIPS. Further, the 9370s offer more competitive price/performance.

On the other hand, System/36 and 38 operating systems, SSP and CPF, are not compatible with VM/CMS or CICS and DOS or MVS on the 9370. CPF provides a more advanced and shareable data base and a conversational environment not available from the 9370s. SSP is easy to use with minimal operator training.

Unless IBM fixes these defects in its mainframe software and builds bridges, it will lose a significant portion of its System/36 and 38 customer base to DEC, Data General Corp. and other supermini vendors, all of whom offer systems that are superior to IBM mainframe software for this customer group. This is almost inconceivable, since IBM has sold more than 20,000 System/38s and more than 120,000 System/36s.

Merge System/36 and 38. IBM could try to reduce the number of mid-range systems. It could develop a new machine we might call a "System/39." Alternately, it could simply encourage System/36 users to move to the 38 with conversion utilities. Finally, IBM could enhance CPF on the System/38 so it can run SSP and System/36 application code as a virtual machine or task.

Conversion for most System/36 and 38 users to a new machine would be easier than conversion for 370 users. IBM 370 installations often build applications in assembly language that take advantage of operating system user exits; some even modify operating systems internals. System/36 and 38 users rely almost exclusively on higher level languages. Unless the System/39 were a superset of both the System/36 and 38 and could run programs unmodified, this would still be a significant undertaking.

There is a rumor that the next release of CPF on the System/38 will be able to run System/36 code as a task. If this is accomplished through software emulation, it will not be very efficient. It also will not replace small System/36 installations unless IBM markets smaller, less expensive System/38s.

Produce a "9360" and "9380." The very large-scale integration (VLSI) circuit technology in the System/38 is almost identical to that used in the 4300. A System/38 Model 700 uses essentially the same chips as the 4361. IBM could maintain this parallel by announcing a new System/38, a "9380." The 9380 could take advantage of the thermal conduction modules, VLSI technology, packaging in Electronics Industry Association (EIA) equipment racks and integrated enhanced small device interface channel communication features of the 9370. The new System/38 would run CPF and System/38 application code with no change, probably without even a recompile. This approach could also be used to build a 9360 version of the System/36 that would run under SSP.

IN THEORY, IBM could abandon the System/36 and System/38 and try to move its entire customer base to 370 machines.

This alternative would allow IBM to produce a System/38 that is two or three times faster than the Model 700. It would minimize production costs for the 9370, 9360 and the 9380. The 9360 and 9380 could be physically integrated with the new 9335 disks, and a complete system — CPU and disks — could be configured, as with the 9370, in a single equipment rack. As mentioned above, this would alienate some recent purchasers of the System/36 and 38. That possibility did not, however, stop IBM from making 4300s, System/34s and 8100s obsolete.

Support CPF on the 370. In January, IBM announced a partial solution for the now-abandoned 8100. During the next two years, IBM says it will develop a new version of 8100 DPPX, its distributed processing executive, for the 9370. It does not, however, plan to move DPCX or DOSF, the 8100 office automation system.

This approach may signal a strategy that could be applied to other mid-range systems. CPF was originally developed on a 370 and was designed to be retargetable; in other words, the software makes few presumptions about underlying hardware. Just as Unix is available on many different CPUs, CPF and System/38 application code could be moved to some other physical machine. If IBM were to retarget CPF for the 9370, users would reap all the advantages of the 9360/9380 option and would further gain the promise of IBM supporting CPF in even bigger mainframes, such as the 6-MIPS 4381 or even the 50-MIPS 3090.

This option is technically feasible for the System/38. It may be less attractive to retarget SSP from the System/36 to the 370 because of greater differences in underlying architecture. More important, it raises difficult marketing questions for IBM.

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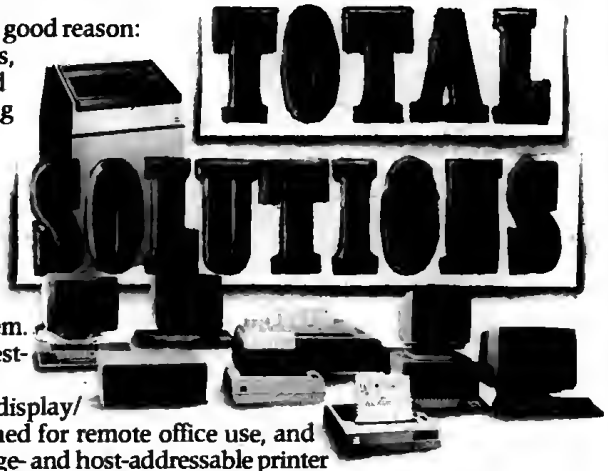

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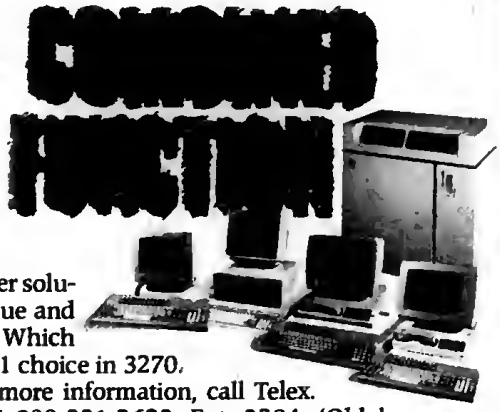

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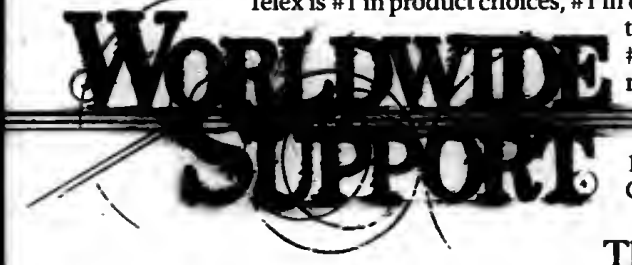

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that its large mainframe users might be afraid that CPF is intended as a replacement for MVS and CICS. This may seem foolish, but IBM believes that its mainframe users are terrified of change. It was slow to develop the relational data base DB2 because IMS users feared abandonment. It canceled the Future Systems project, on which the System/38 was based, even though the former was technically superior to MVS. The company may just not want to gamble by putting its best operating system on 370 hardware.

The primary advantage of supporting CPF on the 370 is that IBM could eliminate some of the perception of architectural incompatibilities across its product lines and reduce DEC's marketing advantage of a single VAX architecture.

IBM's next moves

IBM is correct when it describes its mid-range user community as displaying a variety of needs. Diverse needs reflect, in part, the differences between a one-programmer System/36 shop with a few users and a business with 50 or more programmers and a dozen sites with a hundred users each.

Much of this diversity is the direct result of IBM's own marketing strategy of the 1970s, which encouraged users to become dependent on several different operating systems and machine architectures. As demonstrated by DEC's single VAX architecture, which extends from a $12,000 Microvax 2000 to a 30-MIPS Vaxcluster, the number of IBM's systems are unnecessary — a liability rather than an asset.

It is not apparent which of these options best meets IBM's interests or the needs of most of its current and potential customers. Whichever option the company selects, it will hurt some customers and make others happy. IBM seems to believe, at least in the short run, that it should continue to upgrade current hardware and software. It has decided to counter the VAX architecture by selling common office automation programs and presumably other utilities for its many systems.

IBM might be surprised to find that many customers with installed System/38 machines would prefer a new 9380 or a retargeting of CPF to the 9370. These options can support a doubling of system performance to 5 million and 10 million instructions per second in 1988 and 1990, respectively.

The options also increase the probability that IBM will provide channel-speed communications between multiple 9380 CPUs and between 9380s, 9360s and 9370s. This would result in a system similar to the Vaxcluster for System/38s and 36s with DDM software. Users could configure systems with five or 10 CPUs of 3 million, 5 million or 10 million instructions per second each and could process data bases of 100 billion bytes.

This move would furnish a viable migration path, although it would not provide the dynamic process relocation, remote calls and other features one would want from a distributed multiprocessor system.

If IBM markets all of these systems as physically compatible drawers in a 9300-series EIA rack using ESDI channel-speed communications, it would essentially have achieved the rumored goals of its Fort Knox project. That project, discussed in trade journals a year or two ago, described a single system that could run System/36 and 38 and 370 code all at once with file sharing.

AS DEMONSTRATED by DEC's single VAX architecture, which extends from a $12,000 Microvax 2000 to a 30-MIPS Vaxcluster, the number of IBM's systems are unnecessary — a liability rather than an asset.

Although growth has been sluggish for the last 18 months, IBM's biggest single revenue stream continues to flow from its large mainframe systems. However, it will need to face the challenges to its mid-range to protect that stronghold.

The Vaxcluster and recent DEC announcements of the 8974 and 8976 already compete with IBM mainframe installations. DEC, DG, HP and other minicomputer vendors will build larger versions of their systems as applications grow to require greater system resources. IBM would like to prevent its minis growing to the point where they compete with its mainframes, but it will not have that luxury if it wishes to remain competitive.

Admittedly, all of the above are hypotheses based purely on careful reading of the trade journals and estimates of IBM's business interests. These hypotheses seem reasonable, but IBM could surprise us. In the past, it has sold several systems as trial balloons just to test market response.

IBM could possess a unique new technical solution for the 1990s and beyond, or it could sleep on the problem until everyone converts to DEC, DG or HP. Top management may not even know what it will do, and internal corporate battles probably still rage, with technicians developing all of these alternatives and others. Even if IBM builds a 9360 or 9380, it may use another name just because it likes to be inscrutable. •

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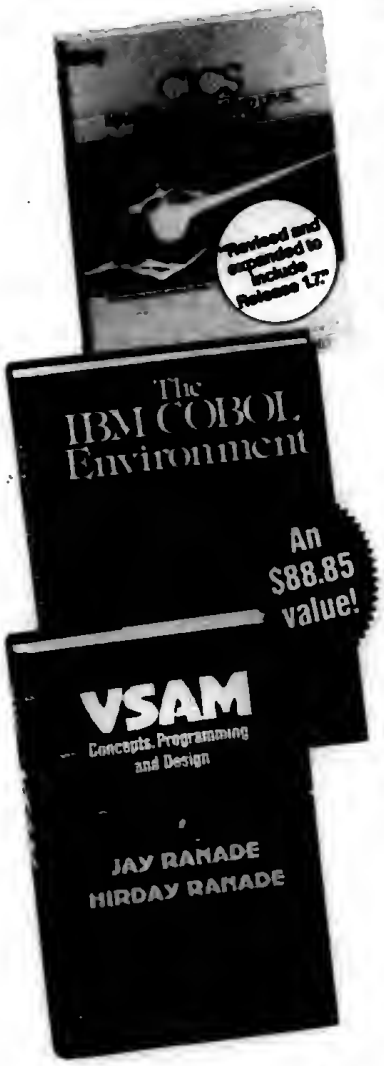

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COMPUTERWORLD

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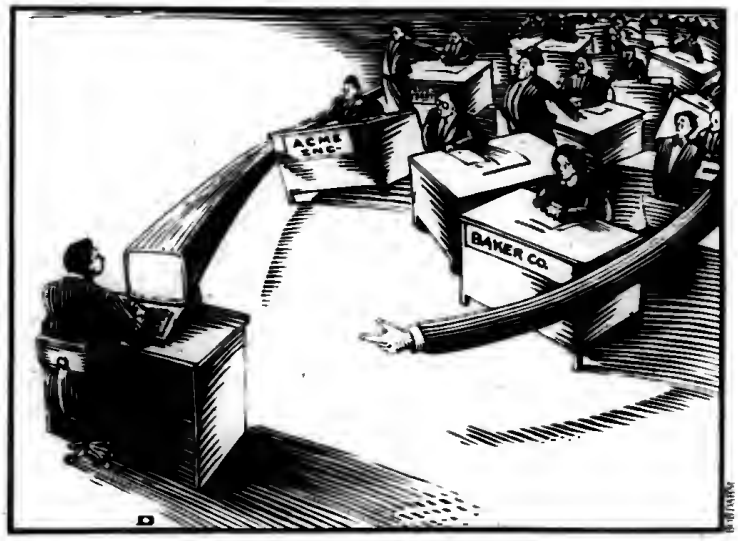
Emerging sales software shows bottom-line promise

Just like spreadsheets, sales and marketing packages are spilling over from PCs onto large systems

BY JIM WALLERSTEDT



The software industry perennially creates more sophisticated and interactive products — this is nearly as inevitable as death and taxes. Yet, from the various products brewed in the cauldron of user requirements occasionally emerges what must be considered a new brand of applications software.

When such a phenomenon combines with a strong potential to affect a company's bottom line, an exciting development occurs that deserves the attention of MIS and user communities alike. Such is the nature, it seems, of sales management software.

Because sales management software is not yet a mature set of applications, a wide range of features has not yet jelled into clearly defined programs. Harry Gilliam, president of software vendor Sales and Marketing Systems in Washington, D.C., observes, "Sales management software today is where accounting software was 20 years ago. In another five to 10 years, you'll see all the various kinds of support develop into sets of generic modules and vertical market versions, just as with accounting software."

A tool by any other name

Sales management software is often called by other names. Some vendors suggest theirs is "sales support" or "sales and marketing" software or that it makes up a "marketing information system."

The primary difference between the new genre of canned sales management software and the older, disparate forms of management support is that the new packages encompass the sales prospecting efforts of a company, serve as event-management or tickler systems and provide management reports that bridge prospective customers and sales as well as existing ones.

The new packages are also defined by a high degree of support delivered directly to the individual sales representative. Many existing systems offer sales analysis or related reports but are rather general in purpose in order to serve the needs of multiple departments.

More current sales management systems offer the kind of reports with which sales representatives are used to dealing on a daily basis, such as call reports, daily reminder and expense reports.

These systems also offer sales and marketing management the ability to massage and evaluate a great deal of information captured within the files, either through user-defined fields or through automatically updated fields, such as "date of last call" or "date entered."

Order-entry breakdown

In addition to canned sales management systems, there are many mainframe-based, home-brewed systems in larger organizations that tend to have a different character and are more appropriately termed "sales support systems." Order entry is the main point of departure between the two types.

Order entry is unquestionably the Achilles' heel of the canned systems; file-transfer procedures on these systems invariably require customized development.

Most mainframe systems, on the other hand, are elaborate order entry systems, with a bit of electronic mail or management reporting thrown in for good measure.

However, mainframe systems tend not to offer comparable levels of support for prospecting, telemarketing and daily productivity. They can, with planning, graciously coexist with a canned application offering

Wallerstedt is president of Wallerstedt & Co., a La Jolla, Calif., firm that provides systems development and services to companies seeking increased computer support for sales efforts.

- **'Event management' for better prospecting**
- **Sales support vs. marketing support**
- **A survey highlights sales force productivity**

these features.

Sales management software benefits sales and marketing departments by providing the following:

- A higher level of communication with prospects and customers through productivity aids such as a word processing interface, autodialing and selective searching.
- More efficient use of time through daily scheduling tools, call reports and automated tickler systems.
- Greater ability for management to measure and understand sales performance, campaign effectiveness and other important criteria.
- Better targeting of prospects for selling and cross-selling and a more professional image as a result of addressing markets more specifically.
- Bonds of convenience and practice between customer and supplier based on use of the sales support system. This bond translates into significant competitive advantages.

Power addicts

Like the spreadsheet software that began sprouting in the accounting departments during the early 1980s, many personal computer-based versions of sales management software are increasingly wending their way into large and medium-size organizations. And like spreadsheets, this application will not be satisfied to stay on the PC.

Furthermore, vendors and users note that sales departments find the newfound power addictive. In fact, the use of sales management software for sales is analogous to the spread of Lotus Development Corp.'s 1-2-3 in accounting.

Powerful personal computer-based programs with outstanding features are available for less than $500. Local-area network versions of these, running on newer chips, can match minicomputer performance while coexisting with PC applications.

The same products for minis are purchased in modules and typically sell for $2,000 to $60,000, depending on configuration. Examples of available modules include field sales, telemarketing, mail, time or marketing management; electronic mail; expense reporting; lead

Continued on page 73

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DEC covers all bases

BY MICHAEL SULLIVAN-TRAINOR

Designing a sales and marketing package that is generic enough to meet most companies' needs and open enough to allow easy customization is a challenge for vendors.

Digital Equipment Corp. is one of the largest office systems vendors attempting to meet that challenge with its own application, the All-In-1 System for Sales and Marketing (SSM).

SSM comes with three components: a base system module that tracks sales contacts and prospects; a field reporting module that includes expense tracking, sales activity statistics and forecasting; and a lead management module that lists sales leads and allows reports to be created.

The package is designed to let users move seamlessly between the modules and office systems functions. Accessible from the All-In-1 Version 2.0 menu, SSM costs $11,000 for the VAX-11/730, 750, 780 and 785 and $12,650 for the VAX 8600. Prices range from $6,600 to $7,590 per CPU for clustered VAX systems.

Chemical Bank in New York is testing DEC's claims that the package can be easily adapted. The bank acquired SSM and a VAX-11/750 in January with the goal of implementing it as a nationwide sales-force tracking system. During the customizing phase, the system will run in the bank's New York noncredit sales department, supporting 10 users, says Malcolm Smart, a consultant hired to tailor the system.

If the customization is successful, Chemical Bank will implement the system nationwide, allowing bank executives to track the amount of time each member of the sales force spends on particular functions.

"That's not tracked now in any efficient manner. I think the management team will be surprised when they have access to this information," Smart says.

The bank chose SSM because it is integrated with All-In-1, DEC's office system software, and because it can be customized. One feature that made SSM attractive, Smart says, is that it includes utilities that allow users to design their own screens, making modification of the system for specific functions easier.

Despite the system utilities, SSM will require extensive customizing to adapt to Chemical Bank's needs, according to Smart. For example, adjustments will be made to accommodate the hierarchy of the bank, which requires communication between departmental, regional and national sales executives. SSM is designed to work in a multidepartment organization but not in a company as complex as Chemical Bank, Smart says. ●

Sullivan-Trainor is a senior writer for *Computerworld*.

Sales tools

FROM PAGE 72

analysis; and order entry.

Users who have installed sales management software agree that it can profoundly affect an organization. Roger Hance, president of R. R. Gable, a real estate brokerage firm in Northridge, Calif., maintains, "There's no question that the use of the computer in sales management can potentially revolutionize the practice of marketing. It has a profound ability to change the fundamental relationship between management and salesperson and between salesperson and client."

Hance's firm purchased the Sales Manager System, a Hewlett-Packard Co. HP 3000-based product, from Business Systems Associates, Inc. in Canoga Park, Calif., two years ago. The system's initial cost was $3,000, although many modifications have been made since. It includes modules for scheduling, electronic mail, sales forecasting and territory management.

In establishing the system, Hance kept specific goals in mind. One goal was to better manage sales leads. In analyzing its lead generation costs, the firm discovered that a typical lead cost between $80 and $100 and, further, that a large percentage of those leads were either lost or mismanaged. Today, Hance says, "we make certain to capture each of these leads as soon as it comes in."

Another goal was to enhance communication with current and prospective clients. With the use of its sales management system, R. R. Gable's brokers can keep clients aware of activities undertaken on its behalf by writing reports based on notes in each client's contact record.

Other benefits of using the system include improved sales, through review of brokers' daily scheduling records, and the ability to specifically identify and address target markets and submarkets.

Hance observes, "Where in the past we might have made a direct mail or telemarketing campaign that would shotgun across a group, we are now able to break that into several more specific campaigns based on demographics fields and carry these out without increased manpower. The net result is performance that is only possible with computer support."

'More punch per dollar'

Management's awareness of DP as a strategic resource is strengthening. This awareness of — and willingness to invest in — DP increases the opportunity for MIS to propose high-profile systems that are innovative and aggressive. Sales management software is potentially a favored recipient of this goodwill.

In addition, various megatrends, such as deregulation and increased foreign competition, coincided to increase competitive pressures and simultaneously to erode profit margins across major industries in the U.S.

Many industries, including professional services, are reacting to these mounting pressures by becoming much more marketing oriented and by experimenting with advertising and direct-mail techniques.

One result of these changes is greater competition for the consumer's interest and for his pocketbook. Correspondingly, the changes have created an opportunity for data processing resources to aid organizations in implementing new strategies.

Lou Wallis, a senior research associate for The Conference Board, Inc., recently completed a study of 160 Fortune 500 firms regarding computerized sales support systems. Wallis says that because of competitive pressures, sales force productivity was an important topic at many recent board meetings.

Wallis cites the rising high cost of sales calls made by field sales staffs, noting, "Companies need to focus on delivering more punch per dollar. They need to prospect and prequalify more actively and use telemarketing and direct mail. Many of these activities, by their intrinsic complexity and volume, are ideally supported by a computerized system."

> "THE INCREASED consistency of data and procedures allows us to manage prospects and service activity more efficiently."
>
> ARTHUR HINDMAN
> INSTRON CORP.

'Beyond expectations'

"Initially, we needed to tie together our branch offices more quickly than we could by developing our own software," explains Arthur Hindman, who spearheaded the introduction of a corporate sales management system three years ago at Instron Corp, a Canton, Mass.-based manufacturer of stress-analysis instruments. "Our goal was to provide a consistent data base to support sales and marketing."

The system, Waters Business Systems, Inc.'a WBS Marketing System, provides separate modules for field sales management. "The WBS software helps us to standardize the flow of information into the home office, then send it back to the branches in a more digested, productive form," says Hindman, Instron's manager of international sales. "The increased consistency of data and procedures allows us to manage prospects and service activity more efficiently than in the past."

The software cost approximately $50,000, although, once again, the source code was greatly modified. While Instron's main processor is an IBM 4300, for reasons of accessibility and cost, the system was placed on a dedicated IBM System/36. Instron presently has tied 17 branch offices in the U.S. and Canada to the application.

Hindman stresses that although the system offers predesigned reports, Instron found great flexibility in defining its own. One useful report Instron developed forecasts sales, anticipating the number of closes based on probabilities, along with expected dates and amounts by product line. The company has also broadly applied its system to handle service activities as well as sales.

According to Hindman, "Initially very few salespeople thought it would benefit the field. Management thought it would benefit greatly but was skeptical about whether it would work. As it's turned out, the benefit to the field has grown sharply beyond staff expectations.

"On the other hand," he continues, "management's expectations have either declined or become more realistic: They realize that maintaining the system requires a lot of attention and advocacy."

The DP department, with a host of solutions, could be a catalyst in assisting sales and marketing to automate the sales process. "Data processing managers need to be more proactive in responding to opportunities within the sales and marketing departments. A primary problem is that DP and sales often have problems speaking the same language," notes Van Mayros, author of *Marketing Information Systems* (Chilton, 1982) and president of Infomarketing Systems Corp., which conducts seminars on computerized marketing support systems.

Language barrier

Mayros points out that vice-presidents of sales or marketing typically know they need computer support, but they need to be shown examples and specific possibilities before anything can be actually formulated.

"We find quite often that the salesperson is terrifically interested but needs a lot of help in developing a structure for the data, codes and procedures, even within the framework of a predesigned, canned application," Mayros says.

John Kennedy, president of Marketing Information Systems, a Chicago-based vendor of sales management software, echoes this sentiment. "I have to sympathize with the systems analyst," Kennedy says, "to the extent that the sales department often has trouble translating needs into a clearly defined problem. What you

Benefits of sales support systems

In a 1986 survey of 45 large companies with sales support systems, one out of four companies reported the system has altered selling tasks in some way. A few see the job of selling as becoming more analytical; none sees the job devalued in any fashion.

Benefits	Percent of 45 companies reporting[1]
Information to the field	80%
Individual time and territory management	58
Order to shipment time	56
Sales volume per salesman	51
Length of sales cycle	36
Calls per salesman	36
Control of sales expenses	31
Sales call reporting	31
Bid or proposal preparation	29
Orders to calls ratio	18
Sales training	18

[1] Multiple responses.

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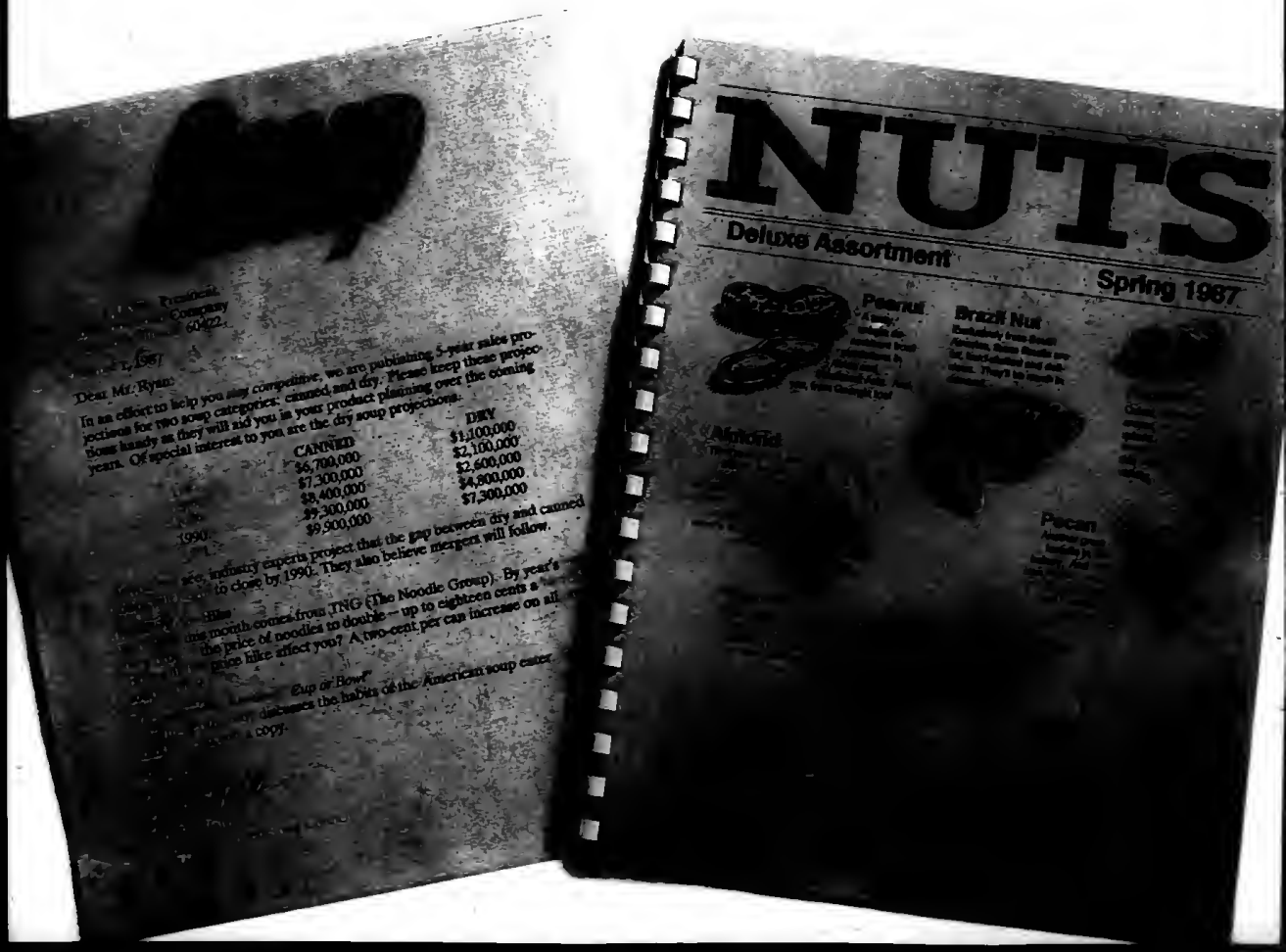


end up with is an undefined problem and, therefore, no solution."

On the other hand, everyone agrees that the potential for harnessing more computer power for sales and marketing represents an advantage. Kennedy notes, "Sales and marketing represents the last major business application to be given computer support."

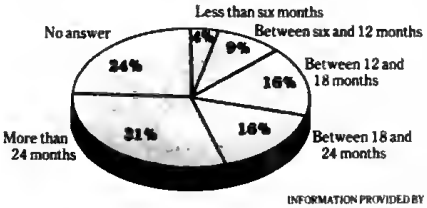
Sales and Marketing Systems' Gilliam offers a concrete example. "Nearly all software increases efficiency. So let's suppose you have a company that generates $10 million per annum in gross revenues," he suggests. "Suppose its accounting department has an annual budget of $400,000. If you develop a system that increases the department's efficiency by 10%, you've impacted the bottom line by approximately $40,000.

"Now, if you could improve the productivity of the sales department by the same margin," he continues, "you would generate gross revenues of $1 million. That could affect the bottom line from a few hundred thousand to a half million dollars or more. Where else does a company have the opportunity to make that kind of return on investment?"

Where, indeed? At the same time, everyone agrees that implementation and user acceptance are sticky wickets. Kennedy says, "The key to success is not the hardware, not the software, but how the organization accepts the new system."

Payback period for sales support systems

In a 1986 survey of 45 large companies with sales support systems, one-third of the companies report their salesmens' earnings have increased. Nearly two-thirds expect the number of sales personnel will be unaffected by the system, 13% expect the number will increase, and only 4% expect it will decrease.



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Melting resistance

Users echo similar sentiments, noting that the changes wrought by a new system must be compensated for early on by productivity and operational bonuses. Mayros says he feels the central issue is in convincing the sales department to embrace the system as its own. He remarks, "First of all, you have to convince the individual salesperson that it will increase his commissions and his efficiency — which it will.

"Second, you need to select a cooperative territory — what might be termed a 'prototype' territory — to serve as the project guinea pig," he continues. "In return, you may offer the territory manager an increased budget and an opportunity to avoid lots of paperwork in his situational reports while improving his stature and results."

A certain amount of preexisting resistance is often felt from the sales and marketing departments. Sales managers generally consider selling to be an individualized, personal activity. Kennedy says, "They always say, 'But we're unique.' The truth is that, even though they're unique, they can be supported. Most find the fundamental problems [to be] staying on top of their leads, daily activities and communications."

Another source of resistance is that sales staffs realize that many activities that were previously unmonitored will receive scrutiny, including daily schedules, length of phone calls and general progress.

On the other hand, sales representatives understand the phrase, "Time is money." The salesman tends to generate results and income proportional to the amount of "face time," or direct contact time, spent each week among prospects. The less desirable portion of the sales representative's responsibilities involves administrative chores, a necessary evil. These include call reports, expense reports, clerical duties and routine correspondence — the primary areas in which the support system offers support. The net result is a lessened administrative burden and more face time.

Companies find that by using support systems, sales representatives are often able to increase their level of weekly contact while reducing the hours spent tending to administrative duties.

Another, less tangible, factor capable of combating any anti-computer bias within the sales departments is the experience of an enhanced professional image. A good sales support system can make the sales representative appear to be more informed, responsive and sophisticated in front of the customer. This may be particularly true for groups that effectively use portable computers to support the field sales staff.

Here's your system

Hindman suggests that the chances for a smooth project can be greatly increased by involving the sales department in the decision to acquire a system. "Typically," he says, "management or DP gets ahold of a system like this, then comes over to the sales department and says, 'Hi, guys, here's your new system.' Instead, the sales staff needs to be involved in defining the project from the beginning."

Other users caution that any organization should expect a temporary downward trend in productivity while the sales department gets acquainted with the system.

The specifics of implementation turn out to be an interesting and varied lot, ranging from

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management of a wide variety of data to order entry.

Data management. While the sales management system contains the names of prospects and customers, the accounts receivable system contains only customers. A core set of data fields, such as names, addresses and the like, applies to both. But even at this fundamental level, the contact name for the sales department can be different from that for the accounting department; the billing address may be different from the address for mailing literature.

Additionally, the sales software will need demographic and ancillary information that will not apply to the customer files, such as date of last call, bid amount or number of children in family. Conversely, many fields within the customer files, such as shipping terms or finance charges, simply will not apply to sales development.

Most firms find these to be good reasons to keep the data bases separate from each other. According to Mayros, "We've found that it generally works best to let marketing separately maintain and control their data base or, where applicable, update the master record."

Data collection. Elia Georgiades, president of banking consultancy Financial Sales Management Institute, says, "Within the financial services industry, one of the primary questions has always been, 'What data should we capture at the time of sale?' It used to be that the answer was only those needed to support transactions processing. Now, with a greatly increased focus on marketing, there is new data to be captured: net worth, tax bracket, investment objectives and the like."

Order entry. Order entry is another major issue. Mainframe-based support systems, while they may be weak in other support duties, were typically designed to serve this function. On the other end of the spectrum, minicomputer and personal computer vendors differ in their approaches to order entry. Some encourage implementations to be coordinated or integrated; most do not.

The main reason for this difference of opinion has to do with the issue of cost vs. utility, or payback. One vendor, dealing with an organization that maintains its accounts receivable files on a large system, may feel that the potential revenue is worth the effort of integration; another may not.

There is a broad range of need across industries in this regard, so that placing a value on this coordination is difficult. However, many vendors offer quotes for tailoring their systems to work with a company's existing accounts receivable system.

The important point is that sales management, marketing management and sales prospecting functions can be provided by a system that exists independent of accounts receivable and order entry.

For example, a simple, common link between the two independent function groups is a sales management system that at the time of order spits out a single-page order summary, which is then manually entered into the order entry system.

However, file-transfer procedures can be useful. Several firms have established a clever routine whereby, in a daily batch run, the accounting system updates customer biography and sales history fields in the sales system, which then updates the accounting files with new order information. This process remains the same whether the applications are on the same processor or whether they are connected by phone lines.

These functions become even more interesting when a portable personal computer calls in to a mini to upload order entry and download electronic mail and current sales history while the mini is refreshed by the accounting files on a larger processor.

Watch the new kid

Sales management software is a new kid on the block but one well worth watching. The general sense one absorbs in talking with vendors, industry experts and consultants is one of excitement. This new application is obviously one with promise.

While stories are told of companies that fail abysmally in their efforts to computerize sales functions because of internal resistance and poor planning, other organizations report substantial increases in sales, particularly in industries that do a great deal of prospecting.

The Conference Board's Wallis notes that it would not be a bad idea, while you are at it, to consider buying some stock from your vendor. He observes that the results of his survey among the Fortune 500 indicates that "most of these systems are put on-line with the expectation of helping the customer, making the firm appear more professional and increasing sales force productivity. At the same time, many of them do pay for themselves within a year." ●

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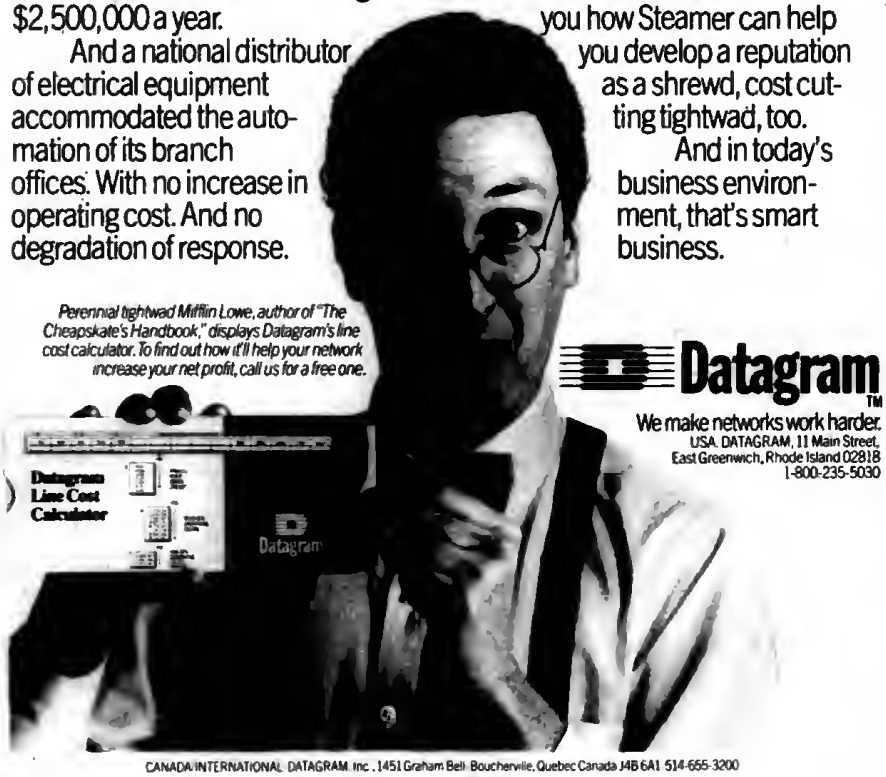

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TAKING CHARGE

Jeffry Beeler

Warranties can backfire

In the long run, MIS managers who buy large quantities of microcomputer applications for their users may benefit financially from something that recently happened — or, more precisely, failed to happen — in the California legislature.

During a recent press conference in Sacramento, Assemblywoman Gloria Molina announced that she was suspending her efforts to enact a law to force the state's software developers to strengthen their warranties.

Molina's announcement concerning Assembly Bill 1507, which she introduced, came only 36 hours before she vacated her seat in the legislature to join the Los Angeles City Council, although that move reportedly had little, if anything, to do with her decision to drop sponsorship of the bill.

Instead, her actions were prompted solely by recent events within the industry itself.

In their early days, many microcomputer software develop-

Continued on page 81

Fed security advice assailed

Bill would shift advisory role to civilian group

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The government's National Computer Security Center, which offers federal agencies and private businesses help with data security, faces controversy regarding its usefulness to the civilian sector, according to testimony at a recent congressional hearing.

The center, which is run by the National Security Agency (NSA) near Ft. Meade, Md., assists businesses with data security in accordance with President Ronald Reagan's National Security Decision Directive 145.

The center has worked with more than 70 agencies since the directive was signed in 1984, according to testimony given to the House of Representatives' Government Operations Committee by Lt. Gen. William E. Odom, the director of the NSA. Its services range from training courses and briefings to in-depth technical assistance, he said.

Wrong agency?

While there is widespread agreement that federal agencies need to improve security, a debate is going on in Washington about whether the NSA, a unit of the Department of Defense, is the proper agency to handle the job for civilian agencies. Its role in aiding the private sector is also being questioned.

"In my view, it is critical that Congress re-establish civilian control over the federal computer security program," said U.S. Rep. Jack Brooks (D-Texas). Brooks is pushing legislation that would transfer the center's work with civilian agencies to the National Bureau of Standards [CW, March 2].

Robert H. Courtney Jr., a computer security consultant in Port Ewen, N.Y., was highly critical of the center's efforts to help the civilian agencies that do not handle classified national security information.

Courtney said that because the center is embedded in the intelligence community, it tends to

Continued on page 80

Standard rates for MIS urged

BY DAVID A. LUDLUM
CW STAFF

A major association of management accountants has recommended that information systems organizations generally charge their internal users standard rates or amounts for information systems services.

The recommendation from the National Association of Accountants, which claims a membership of 90,000, is contained in six pages of guidelines called "Allocation of Information Systems Costs," one in a series of statements on accounting principles and practices issued by the Montvale, N.J.-based organization.

Unless a general accounting policy dictates otherwise, information systems costs should generally be charged to users at fixed rates or amounts because line managers should not be responsible for variations in costs beyond their control, the association says. Only the costs that line managers can control should be charged, the guidelines say.

The charges can prompt line managers to talk with information systems managers about how best to achieve their goals, encourage efficient allocation of resources and encourage the MIS organization to control costs, the association says.

With the proliferation of in-

Continued on page 80

MANAGERS ON THE MOVE

Shipping firm pilots new customer systems

BY DAVID A. LUDLUM
CW STAFF

Among the tasks facing **Ronald L. Olive** as the newly appointed vice-president of information resources at **American President Companies Ltd.** is testing systems for interacting with customers.

The customer systems are now in a pilot phase and could be operational by summer, Olive said. They reflect the growing use of automation for customer outreach among shippers following similar moves by airlines, he said. "Electronic interface is going to be very much a part of the transportation industry."

Olive, a former IBM executive, declined to elaborate on the new systems. "I'm not sure we're really ready to expound on those publicly. For competitive reasons, we're keeping that a little bit close to our vest," he said.

Following a restructuring of American President in January,

Continued on page 83

Data View

Spending levels

Information systems spending as a percent of total revenue

Industry	*Percent*
Agriculture/Mining/Construction	1.0
Nondurable Manufacturing	1.3
Durable Manufacturing	1.6
Transportation/Utilities	1.0
Wholesale/Retail	0.6
Insurance	1.6
Other Financial Services	2.6
Health Services	2.3

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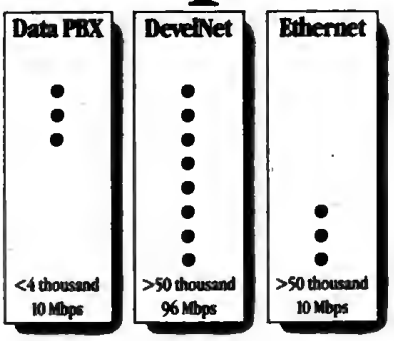

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Fed security

CONTINUED FROM PAGE 79

focus more on preventing the disclosure of classified data than on preventing the alteration of data at civilian agencies.

"It is important that those developing security measures for federal agencies understand that the security problems of many agencies more closely resemble those of J. C. Penney than they do those in [the intelligence community]," Courtney testified.

Cheryl W. Helsing, vice-president and deputy director of corporate security at Bank of America in San Francisco, who testified for the American Bankers Association, expressed concern that the NSA favors solutions that are too stringent and expensive for the private sector.

As an analogy, Helsing said if a client could travel on a motorcycle, in a truck or in a tank, the NSA would choose the tank over the other two methods of transportation. "The danger in doing this is that the road to be traveled might not accommodate a tank, or the traveler might not be able to afford the price tag. Thus, the trip might not be taken at all," she said.

Center opposes legislation

The NSA's Odom said the National Computer Security Center, with a staff of more than 300, has the expertise to help the civilian agencies and opposed Brooks' legislation.

Odom said the center's standards and programs "are equally useful in both the defense and non-defense sectors of the U.S."

He added that one of the center's most extensive contacts has been with the Department of State, which recently issued a request for proposal for a five-year, $400 million contract for DP systems.

The department worked with the center to analyze the sensitivity of its information and the hostile environments of several of its DP sites, Odom said.

Must meet security level

After that analysis, the department decided it would require DP systems that meet the B-2 level of security.

NSA certifies computer operating systems as "trusted systems" by ranking them on a security scale that ranges from C-2 up to A-1.

Odom said that other major projects undertaken by the National Computer Security Center include the following:

- Helping the U.S. Customs Service design DP systems for investigations of drug trafficking.
- Working extensively with the Department of the Treasury on computer security policy, including a request for proposal for a $600 million minicomputer contract calling for security levels ranging from C-2 through B-2.
- A one-year commitment to help the Federal Aviation Administration improve its computer security, particularly for the next-generation air-traffic control system, which will get a C-2 level of security.

Standard rates

CONTINUED FROM PAGE 79

formation systems in business, financial managers are increasingly concerned with issues such as the impact of the costs of technology on the profitability of business segments and specific products, says Robert G. Weiss, vice-president and controller of Schering-Plough Corp. and chairman of the association subcommittee that issued the guidelines.

The association acknowledges that charging users, particularly charging them full costs, might not be a good idea in some circumstances. The circumstances include:

- When it would discourage development or use of systems, perhaps because the systems are not widely shared.
- When charges are difficult to explain to users or even to establish, such as when the costs of establishing them might outweigh the benefits of collecting them.
- When the use of systems to collect charges is a less than optimal one or the charges excessively complicate an already complex accounting system.

'Poor system worse than none'

"A poor chargeback system may be worse than none," says William Ihlanfeldt, assistant controller at Shell Oil Co. in Houston and chairman of the association's Management Accounting Practices Committee.

Lack of a chargeback system could result in squandering of resources, but overly rigid or inappropriate systems may encourage users to buy services from outside suppliers in a manner that is not cost-effective, Ihlanfeldt says.

The guidelines list four general approaches to setting charges, which are aimed at different goals. Charging full cost can restrict use of heavily used systems, while charging something less than full cost can encourage use of underutilized systems.

As alternatives, charging a market price or one based on cost plus a fixed profit margin might help ensure adequate returns on information systems investments.

These charges might be in the form of fixed fees for recurring services — such as payroll, billing and general ledger accounting — or regular rates, the association says. The rates might be based on labor time, particularly for labor-intensive tasks such as development; on machine time, especially for operations work; or a combination of the two, according to the association.

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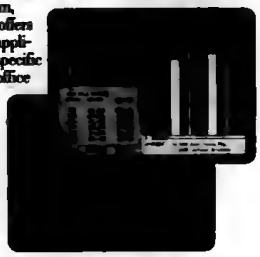
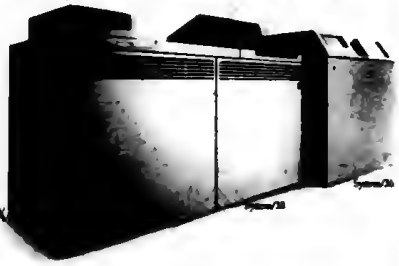
System/36 is IBM's simplest and least expensive entry point into mid-range computing. In addition to being IBM's most user-friendly mid-range system, System/36 also offers a broad spectrum of application software from specific industry solutions to office applications that suit any business.

Here.



For growth, the System/38 provides a built-in relational data base (allowing you access to data on your own terms) as well as a toolbox of programming aids to help you, in a remarkably short time, custom-design applications that fit the job at hand.

The System/3X family members function equally well



System/3X

Warranties

CONTINUED FROM PAGE 79

ers routinely sold their products "as is." In other words, they seldom bothered to accompany their programs with formal, written warranties.

If an application failed to work as expected, its vendor often had no contractual duty to set the problem right.

To no one's surprise, the widespread absence of software warranties led to a growing chorus of user complaints, which in turn triggered a nationwide spate of proposed legislative remedies, including AB 1507.

Alarmed at the prospect of being forced into legislative straitjackets, many vendors acted quickly to put their own houses in order before lawmakers had the chance to do the job for them.

ALARMED at the prospect of being forced into legislative straitjackets, many vendors put their own houses in order before lawmakers had the chance to do the job for them.

ADAPSO guidelines

Accordingly, last April, vendors' trade group ADAPSO drafted and issued a set of suggested warranty guidelines and urged its members to comply with the recommendations voluntarily.

In essence, the guidelines call on software developers to make sure that their products "perform substantially" in accordance with their advertising claims, documentation and specification sheets.

If an application is found to be genuinely deficient, ADAPSO advises its members to choose one of three courses of corrective action — remove the faulty product's bugs, replace it with a functional equivalent or offer a refund.

Proposals find support

During the 10 months since they were promulgated, ADAPSO's warranty guidelines have been put into practice by some 50 software developers, including leading players such as Ashton-Tate, IBM and Lotus Development Corp.

The proposals' widespread acceptance accomplished the same end as the passage of AB 1507 and made the once-desirable bill no longer necessary.

Molina's subsequent move to scrap the legislation, at least for the time being, was hailed by ADAPSO as a triumph of industry self-regulation and voluntary compliance over government intervention.

Users win out

The main beneficiaries of the vendors' recent efforts to improve their software warranties will be home and small-business users, who typically buy in low volumes and without formal contracts.

But even MIS organizations, most of which are already covered by warranties that they negotiate individually with their suppliers, may profit from AB 1507's death.

Under Molina's bill, developers would have been held legally liable for all misrepresentations of their products by authorized dealers.

Heading off lawsuits

Inevitably, the vendors would have faced an increased number of user lawsuits and would have been forced to pass the additional expense along to their customers in the form of higher software prices.

Even MIS executives, with their familiar volume discounts, would have felt the impact.

For software buyers who sued their vendors successfully, AB 1507 would have provided substantial compensation: If found guilty of selling an inadequate product, a developer would have been ordered to pay damages plus the disgruntled user's legal fees.

The company would have also been forced to refund the customer an amount equal to twice the disputed product's purchase price.

Faced with such stiff potential penalties, most developers would have had a strong financial incentive to not contest even the most patently baseless complaints against their products.

Vendors washing their hands

Rather than defend themselves in court and run even a small risk of losing, they could have opted simply to give the user a refund and thereby wash their hands of the entire matter.

Again, the result would have been increased vendor overhead, with all consumers ultimately bearing the burden.

So for MIS managers in California at least, the industry's voluntary effort to upgrade its software warranties and the recent demise of AB 1507 are probably reasons for a modest celebration. Moreover, to the extent that the bill's fate may influence the course of like-minded legislation now being considered in other states, the outlook may have also brightened just a bit for systems executives all over the U.S.

Beeler is a *Computerworld* West Coast correspondent

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as the largest computers in a business or as departmental computers in large companies. And to provide you with the communications and growth options your business needs, the System/3X family was recently enhanced to provide even smoother peer-to-peer communications, greater host and PC connectivity, and stronger networking with IBM 370 mainframes and PCs.

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All this technology is fascinating in its own right. But it just gives you more in terms of real mid-range computing options: growth upward to mainframes, highways between mainframes and PCs or other workstations—or flexible connections with networks and enhancements either from IBM or other manufacturers.

And integrated office solutions to meet your needs are available on both systems.

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Perhaps the best fit of all is the way IBM's mid-range computers fit into your working environment. The 9370s are very neighborly. With set-up times of under five hours and rack-mounted components that can be installed like stereo equipment. System/3X family members are simple to operate and fit in easily, too.

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Here.

A Fitting Conclusion

The reason IBM mid-range systems fit in so well is based on a simple piece of logic: they're built to fit your business, rather than vice versa.

To find out more about which IBM mid-range system is the perfect fit for your company, call your IBM marketing representative soon. You'll learn about the kinds of choices you now have in a mid-range computer, and how you can start making them.

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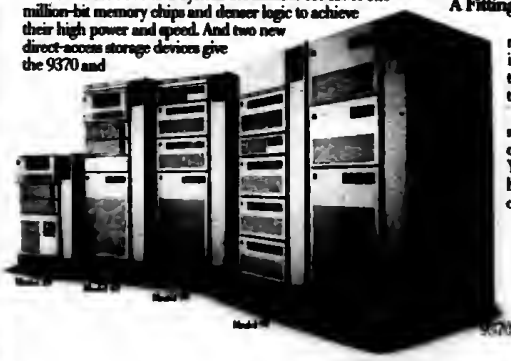

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CALENDAR

MARCH 22-28

Electronic Computing Health Oriented Spring Meeting. Hot Springs, Va., March 22-25 — Contact: Daniel J. Carlton, St. Luke's Samaritan Health Care, Inc., 3000 W. Montana Ave., Milwaukee, Wis. 53215.

NCGA Computer Graphics '87: Applications for Excellence. Philadelphia, March 22-26 — Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

Managing the Information Resource. Los Angeles, March 22-27 — Contact: Suite 2381, Office of Executive Education, University of California at Los Angeles Graduate School of Management, Los Angeles, Calif. 90024.

Sixth Annual International Spectrum U.S.A. '87. Las Vegas, March 23-25 — Contact: International Data Base Management Association, Suite 104, 9740 Appaloosa Road, San Diego, Calif. 92131.

National Capacity Planning Conference. Washington, D.C., March 23-26 — Contact: National Capacity Planning Conference, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

Walker Inter/Actions Users Conference. Denver, March 23-26 — Contact: Walker Interactive Products, 100 Spear St., San Francisco, Calif. 94105.

17th Conference on Computer Audit, Control and Security. Boston, March 23-27 — Contact: EDP Auditors Foundation, Inc., P.O. Box 88180, Carol Stream, Ill. 60188.

Datacon '87. St. Louis, March 24-25 — Contact: Datacon, P.O. Box 1401, St. Louis, Mo. 63188.

I/O Interface '87. Gaithersburg, Md., March 24-25 — Contact: William E. Burr, National Bureau of Standards, A216 Technology Building, Gaithersburg, Md. 20899.

Optical Information Systems West '87. Los Angeles, March 24-26 — Contact: Conference Management Corp., P.O. Box 4990, 200 Connecticut Ave., Norwalk, Conn. 06856.

Third International Conference on Computerization of Medical Records. Chicago, March 24-27 — Contact: Registrar, Institute for Medical Record Economics, 121 Mt. Vernon St., Boston, Mass. 02108.

ASM Upgrade '87. Hartford, Conn., March 25 — Contact: Upgrade '87, c/o Computer Assistance, Inc., 200 Park Road, West Hartford, Conn. 06119.

1987 SIM Institutional

Continued on page 86

Shipping firm

FROM PAGE 79

Olive is heading an information resources organization that has expanded its scope from focusing on the company's international container shipping to include domestic rail and truck operations, some of which were acquired last year. He will oversee both day-to-day operations and long-range development of the Oakland, Calif., company's computer, telecommunications and data base systems.

Robert M. Menar

Olive previously served as director of production services in the information resources department, which he joined in 1981 after holding marketing and management positions with IBM for 20 years.

Tony Salmon has been appointed director of management information systems at **International Telecommunications Satellite Organization** (Intelsat).

Salmon, a British citizen, will be responsible for software development, computer center operations, telecommunications, text processing, records, printing and reprographics.

Before joining the 112-nation satellite communications cooperative, he served as head of Information Services for Central Television in Birmingham, England.

William C. Wimer has been appointed director of MIS at **The Interface Group, Inc.**, a Needham, Mass.-based conference-management and travel services firm.

Wimer will be responsible for both the company's MIS operations and its telecommunications.

He has nearly 30 years' experience in corporate information systems management and previously served as vice-president of MIS for Fanny Farmer Candy Shops, Inc. in Wakefield, Mass.

Carter Hawley Hale Stores, Inc. has announced the promotion of Carter Hawley Hale Information Services Chief Executive **R. Vincent Conant** to the post of chairman and the appointment of Executive Vice-President **Robert M. Menar** to succeed Conant as president.

Menar, who had been in charge of systems services, will also serve as chief operating officer.

The Information Services organization, based in Anaheim, Calif., provides systems and communications services to all divisions of Carter Hawley Hale Stores.

R. Vincent Conant

Joseph R. Beauchamp has been named vice-president of systems at the **Compuserve, Inc.** headquarters in Columbus, Ohio. Beauchamp, formerly director of systems, is in charge of the information and communications services firm's operating system, languages, utilities and network software.

Bruce MacNaughton, formerly manager of Compuserve's Monitor Software group, has been named director of Computer Operations and Monitor Software.

Perry Hanson has been appointed director of Administrative Information Systems at **Wellesley College** in Wellesley, Mass., where his duties will include developing campus networks.

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8:30 A.M. • TOKYO, JAPAN

IDG's International Data Corporation managing director **Yugi Ogino** is stopped in his tracks by a flash report on the company's International News Service. *Digital News* has just spotted a potential challenge to IBM's grip on the professional PC market: DEC has announced their Local Area VAX Cluster. Ogino sets up a conference call with *Computerworld Japan* editors to brief them on his analysis.

8:40 A.M. • SYDNEY, AUSTRALIA

At almost the same moment 4,300 miles to the south. *Computerworld Australia* publisher **Susan Coleman** sees the DEC story on her news wire. She calls in **Peter Scott**, her editor, to plan editorial coverage for their market.

11:00 A.M. • HELSINKI, FINLAND

Halfway around the world, **Timo Tolsa**, editor of IDG's Finnish computer newspaper *Tietoviikko Ky*, faxes his comments on the pending story to **Dieter Echbauer**, editor of *Computerwoche* in Germany, who appoints an editorial team to file a comprehensive story for use by all five IDG publications in Germany.

10:10 A.M. • BUENOS AIRES, ARGENTINA

Ruben Argento, the head of IDG's *Computerworld* newspaper in Argentina uncovers a new wrinkle in the rapidly unfolding story—and alerts Doane Perry, senior market consultant at IDC in Framingham, Massachusetts: a DEC competitor in South America is developing a similar cluster product.

has just changed again.

10:30 A.M. • BOSTON, MASSACHUSETTS

IDG reporter **Kathryn Esplin** files a VAX Cluster story for *Digital News*. Her back-up analysis is sent to all publication offices around the world on the company's news wire.

2:00 P.M. • FRAMINGHAM, MASSAC TTS

Perry meets with **Bill Ford**, IDC Information Industry Services Chief, to plan a global research report on computer clusters and their potential impact on business users.

4:45 P.M. • PALO ALTO, CALIFORNIA

IDC Research Director **Jean Yates** faxes detailed schedules of the report requirements to IDC research centers in 16 other countries. Deadline: 1 week. Overnight mail announcements of the pending report are mailed to IDC's top 1,000 customers around the world.

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Morgan Grenfell & Co. Limited
Pictet International Ltd
Scrimgeour Vickers & Co.
J. Henry Schroder Wagg & Co. Limited

MANAGEMENT

Continued from page 83

Member Conference. Miami, March 25-27 — Contact: Society for Information Management, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

12th West Coast Computer Faire. San Francisco, March 26-29 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

MARCH 29-APRIL 4

EFTA Expo. Las Vegas, March 29-April 1 — Contact: Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

The Inevitable Partnership: Leaders Achieving Business Goals Through Technology. New Orleans, March 29-April 1 — Contact: Life Office Management Association, 5770 Powers Ferry Road, Atlanta, Ga. 30327.

Management Information Systems for Strategic Advantage. Philadelphia, March 29-April 3 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104. Also being held September 20-25 in Philadelphia.

Interface '87. Las Vegas. March 30-April 2 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

1987 National Conference on Data Processing Quality Assurance. Chicago, April 1-3 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

1987 Computer Dealers & Lessors Association Spring Meeting. Orlando, Fla., April 1-4 — Contact: Computer Dealers & Lessors Association, 1212 Potomac St. N.W., Washington, D.C. 20007.

Networking: The Large Organization Perspective. Melbourne, Fla., April 2-3 — Contact: Harris Briefing Center, 1025 W. Nasa Blvd., Melbourne, Fla. 32919.

APRIL 5-11

Human Factors in Computing Systems & Graphics Interface 1987. Toronto, April 5-9 — Contact: Wendy Walker, CHI & GI '87 Conference Office, Computer Systems Research Institute, University of Toronto, 2002-10 Kings College Road, Toronto, Ont., Canada M5S 1A4.

1987 Facsimile and Image Communications Conference. Boston, April 6-8 — Contact: Jean O'Toole, CAP International, One Snow Road, Marshfield, Mass. 02050.

1987 Eastern Simulation Conferences. Orlando, Fla., April 6-9 — Contact: The Society For Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

The Comten Users' Exchange Spring Conference. Washington, D.C., April 6-10 — Contact: Dave Beran, NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Fourth Annual International Conference on Technology and Education. Fort Worth, Texas, April 7-9 — Contact: Jimmie Thompson, ICTE, 1400 One Tandy Center, Fort Worth, Texas 76102.

New Directions in Information Management. New York, April 8-9 — Contact: The Conference Board, 845 Third Ave., New York, N.Y. 10022.

Sixth Annual Conference on Trends in Technology for Education and Industry. St. Paul, Minn., April 8-9 — Contact: Combase, Inc., Suite 890, 333 Sibley St., St. Paul, Minn. 55101.

California Educational Computing Consortium. San Jose, Calif., April 9-10 — Contact: Alexia Devlin, San Francisco State University, Accounting Data, NADM-358, 1600 Holloway Ave., San Francisco, Calif. 94132.

Satellite Communications Status '87: Technology, Applications & Markets. New York, April 9-10 — Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

APRIL 12-18

COACH Conference XII. Toronto, April 12-15 — Contact: The Canadian Organization for Advancement of Computers in Health, No. 1200, 10460 Mayfield Road, Edmonton, Alta., Canada T5P 4P4.

Long Range Information Systems Planning. Atlanta and San Francisco, April 13-16 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Commercial Crime Conference. Hong Kong, April 13-17 — Contact: Nelson P. C. Tse, Computer Services, Hong Kong Productivity Council, 12th Floor, World Commerce Centre, 11 Canton Road, Tsimshatsui, Kowloon, Hong Kong.

Software Panorama. Atlanta, April 14-16 — Contact: Data Processing Management Association, Atlanta Chapter, P.O. Box 34, Atlanta, Ga. 30301.

Optica '87 (First International Meeting for Optical Publishing and Storage). Amsterdam, April 14-16 — Contact: Jean Mulligan, Learned Information Ltd., Woodside, Hinksey Hill, Oxford, England OX1 5AU.

APRIL 19-25

Standards: The Ties That Bind. New York, April 22-23 — Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

The Artificial Intelligence and Advanced Computer Technology Conference and Exhibition. Long Beach, Calif., April 22-24 — Contact: Tower Conference Management Co., 331 W. Wesley St., Wheaton, Ill. 60187.

Bar Coding Seminar Series. New York, April 23-24 — Contact: Automatic Identification Manufacturers, Inc., 1326 Freeport Road, Pittsburgh, Pa. 15238. Also being held May 18-19 in Chicago and June 8-9 in Atlanta.

APRIL 26-MAY 2

National Workshop & Computer Systems Demonstrations. Kansas City, Mo., April 26-29 — Contact: Management Systems Committee, American Trucking Associations, 2200 Mill Road, Alexandria, Va. 22314.

Cinteract '87. San Diego, April 26-30 — Contact: Cincom Systems, 2300 Montana Ave., Cincinnati, Ohio 45211.

BMC Software User Group's Second Annual Meeting. Houston, April 29-May 1 — Contact: Marianne Levandoski, AT&T, 30 Knightsbridge Road, Room 50-51A40, Piscataway, N.J. 08854.

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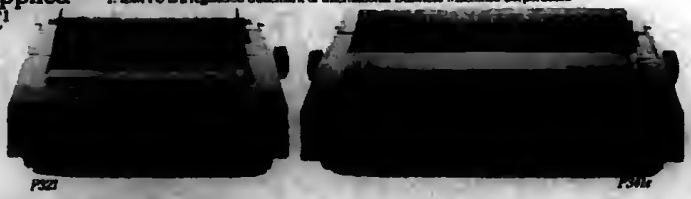

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

U.S. lagging in OSI race

Amid the hoopla and sheer size of the world's largest international computer trade show, Cebit '87 — formerly a part of West Germany's Hannover Industrial Fair — one major theme stood out: multivendor connectivity.

In the data communications area, the recent extravaganza was a showcase for the International Standards Organization's Open Systems Interconnect (OSI) model capabilities from a host of vendors, including IBM.

What was apparent at Cebit was that despite the efforts of the U.S. fledgling, the Corporation for Open Systems, the U.S. still lags far behind Europe in attempts to move toward intrasystem compatibility.

In demonstrations that ranged from practical applications to rather gimmicky displays, at least four exhibits featured multivendor connections. These exhibits included the following:

- IBM's new X.400 message-transfer facility and X.400 Distributed Office Support System (Disoss) connection. In another push for multivendor environments, IBM's demonstration of the VM version of Open Systems Transport and Session Service and Open Systems Network Support included a Digital Equipment Corp. VAX system and a Compagnie des Machines Bull terminal linked to a Bull data base in Paris.
- The initial results of a document-exchange research project from Esprit, the European computer vendors' research consortium. The demonstration featured the transfer of text and graphics among four vendors' systems through Office Document Architecture, an OSI-compatible protocol.

Esprit will conduct further research on similar standards for digital data and voice exchange between incompatible office computer systems. This makes one wonder why the U.S.'a Microelectronics and Computer

Continued on page 104

IBM recruits Syntelligence

BY JAMES A. MARTIN
CW STAFF

SUNNYVALE, Calif. — IBM, showing further signs of competitive pressure from other hardware vendors, announced last week a cooperative marketing agreement with Syntelligence, Inc., a 105-employee vendor of expert systems software for insurance underwriting and commercial lending.

It is the second such Industry Marketing Assistance Program (IMAP) agreement for IBM this year in the insurance industry and reflects Big Blue's determination to climb out of its current slump by offering more complete systems, not just hardware.

Last month, IBM agreed to cooperatively market Policy Management Systems Corp.'a insurance market applications software under an IMAP deal [CW, Feb. 16].

"Other hardware vendors have been more forthcoming in the past about forming joint ventures with software companies because they had to compete with IBM," said David Thomas, associate software and services analyst for Hambrecht & Quist, Inc. in New York. "But the tables have been reversed, and IBM has to compete like everyone else now, especially in selling mid-range systems."

Under the terms of the IMAP agreement, Syntelligence and IBM sales representatives will locate and visit potential customers together, but IBM will not actually sell Syntelligence products.

"The main thing for IBM is still selling hardware," explained Sharon Poole, manager of com-

Continued on page 103

GTE, Fujitsu tie PBX, switches

BY CLINTON WILDER
CW STAFF

SAN JOSE, Calif. — Marking another retreat from the commercial telecommunications business, GTE Corp. last week merged its private branch exchange (PBX) and digital switch business into a joint venture that will be 80% owned by Fujitsu America, Inc.

GTE's Tempe, Ariz.-based Business Systems Division will form the basis of the new company, called Fujitsu GTE Business Systems, Inc., which will remain in Tempe. The GTE unit had revenue of more than $100 million in 1986 and employs about 900 people.

The venture will begin operations April 1. The deal marks Stamford, Conn.-based GTE's third major withdrawal from direct participation in a telecommunications market within the past two years.

GTE spun off its transmission equipment business last year in a similar 80%-20% joint venture with West Germany's Siemens AG, which holds the controlling interest.

And in a highly publicized 1986 move, GTE merged its struggling Sprint long-distance business with United Telecommunications, Inc.'s U.S. Telecom service to form U.S. Sprint Communications Co.

"GTE is getting out of product lines that aren't making money," said Mike Kennedy, a telecommunications analyst with the Gartner Group, Inc. in Stamford. "They will concentrate on defense contracts, local phone service and electronics products."

Sales of GTE'a Omni series

Continued on page 104

Cullinet buys tool, adds CIM

BY ROSEMARY HAMILTON
CW STAFF

WESTWOOD, Mass. — Continuing on its recent spending spree, Cullinet Software, Inc. purchased a nonexclusive license to a financial software package from Computer Associates International, Inc. last week.

Cullinet also announced its first marketing agreement in the computer-integrated manufacturing (CIM) arena since introducing a major CIM strategy earlier this year.

The Computer Associates fixed assets accounting package, which cost Cullinet $440,000, will be tailored to run with Cullinet's mainframe data base management software and is scheduled for availability in a year.

"They came to us, liked what

Continued on page 104

Inside

- **Iomega reduces work force, faces two lawsuits. Page 92.**
- **AT&T adds Computer Sciences to government bid. Page 99.**

CONFERENCE NOTEBOOK

Commercial use seen fueling rapid supercomputer growth

BY ALAN ALPER
CW STAFF

NEW YORK — The supercomputer's ability to reduce corporate costs and development time associated with bringing new products to market will propel its growth for commercial applications, according to vendors and analysts at the second annual conference on supercomputing sponsored by Piper, Jaffray & Hopwood, Inc. here last week.

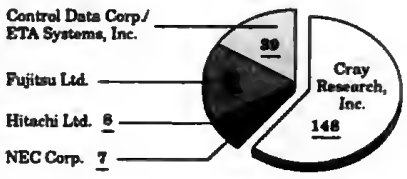
The Minneapolis brokerage house projects that supercomputer vendors' revenues will grow from approximately $800 million last year to more than $2.5 billion by 1990.

For years, supercomputers — large-scale processors optimized to speedily handle mathematics-intensive problems — have been the domain of scientific/engineering firms and university research centers. They are now finding use in pharmaceutical, biotechnology and chemical businesses.

Cray Research, Inc. in Minneapolis, which has installed about two-thirds of the 244 supercomputers in use worldwide, is expected to maintain its market share lead in the near term. The firm is expected to unveil new members of its X-MP family and next-generation Cray 3 during the next three years, which should assure its performance leadership position.

Cray still dominates

Supercomputers worldwide installed base, December 1986



INFORMATION PROVIDED BY PIPER, JAFFRAY & HOPWOOD, INC.
CW CHART

"A large market share is self-perpetuating," noted Jack Worlton, president of supercomputer consultancy Worlton & Associates and a Laboratory Fellow at Los Alamos National Laboratory in New Mexico. "A computer with a large market share guarantees that people will develop software for it and that more people using it in a similar market will collaborate on software," he said.

Analysts, however, are becoming increasingly alarmed by alleged predatory pricing moves made by Japanese supercomputer suppliers Fujitsu Ltd., Hitachi Ltd. and NEC Corp. In addition, both the U.S. government and domestic supercomputer firms contend that Japan has closed its market to U.S. vendors.

"The Japanese are taking advantage of their vertical integration — particularly their ability to produce high-speed components — and their financial power to underprice people like Cray," Worlton said.

Highlights from supercomputer vendors' presentations included the following:

Cray. "We sell on our merits — we don't compete on price," said Bob Ewald, vice-president of commerical marketing. "If other competitors want to, that's fine, but there is a reason others have to give their com-

Continued on page 103

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Business Computing Systems

Shake-ups, lawsuits force job cuts at Iomega

BY ALAN J. RYAN
CW STAFF

ROY, Utah — Iomega Corp., a manufacturer of cartridge-based disk mass storage products for desktop computers, has found itself hit with hard times and two lawsuits.

With a losing quarter ahead, as predicted by the company and industry analysts, Iomega announced last week it would make a 183-employee permanent reduction in its work force. Earlier this year, Iomega President and Chief Executive Officer Gabriel Fusco resigned from his positions, but he remains president of sales.

Iomega, which patented the Bernoulli storage technology, announced in December that nearly 150 employees had been let go. Most worked in management, according to company spokeswoman Linda Dalton.

Last week's 183 permanent cuts — which represent more than 25% of the company's professional, managerial and indirect employees — were accompanied by the temporary layoff of 182 people in the direct labor force. Dalton said Iomega intends to bring the laid-off workers back once business is stable.

Making adjustments

"In early 1986 and through 1985, things looked wonderful," Dalton said. "The company was a new, young company. We were growing by leaps and bounds, and we were hiring like crazy, building buildings and expanding. By the end of 1986, it was apparent that we needed to do some adjusting, and that's pretty much what we're doing."

Although Dalton maintained that the company is continuing to see consistent sales of its products, analysts said the falling prices of Winchester disk drives spell trouble for Iomega's future.

"The real thrust of this is that the price of computers and Winchesters are coming down so fast that everybody now buys a computer, for the most part, with a Winchester in it," said Kenneth Leung of Smith Barney, Harris Upham & Co. "That's why Iomega's potential market share is not growing."

"The company is restructuring to a size which is more appropriate to the current sales level," said analyst James Stone of Shearson Lehman Brothers, Inc. "Some of their previous forecasts may have been exuberant. I think they're now taking a little more realistic approach as to what can happen."

For its fourth quarter of 1986, Iomega reported earnings of $427,000, an 84% decrease from earnings of $2.7 million reported in the year-earlier quarter. Sales for the 1986 quarter of $30.7 million represented an 8% drop from year-earlier levels.

For fiscal 1986, the company recorded profits of $6.4 million, a 57% decrease from 1985.

Leung predicted that in the first quarter ending March 31, Iomega will report a 50 cent per-share loss. He said that by the second quarter, the company may register a reduced loss of 10 cents per share.

To help the firm's ailing finances, Leung said, Iomega should continue to cut costs on the 5¼-in. Beta 20 product to make it competitive with other drives in the industry.

"They're running out of time here because they've got to get this 5¼-in. product into a design-in position," meaning that an OEM will put the Iomega product rather than a Winchester drive into his computer, Leung continued. He said this is crucial as the industry seems to be moving toward 3½-in. drives.

The two lawsuits stem from a shareholders meeting last April in which Iomega's management predicted that sales would continue to grow, Iomega's Dalton explained.

Lanier weathers acquisition storm

BY ALAN ALPER
CW STAFF

ATLANTA — Shortly after Harris Corp.'s late-1983 acquisition of Lanier Business Products, Inc., storm clouds shrouded Lanier's headquarters, located here. Diverging cultures and management styles of Harris and Lanier executives created rifts over the way the office automation products vendor should be operated.

But during the last two years, tranquil skies seem to have emerged. Having been brought into the corporate fold, Lanier now operates semiautonomously as one of Harris' five business sectors. Importantly, Lanier's management has stayed intact and learned how to coexist with its diversified parent.

"It's three years going on four and I'm still here," says Wesley E. Cantrell, president of Lanier and a senior vice-president of Harris. "We've been through some hard things, but Harris management's pride is not so great that they're not unwilling to change if things don't work out."

Despite the lingering slump in capital expenditures for office-automation equipment, Cantrell says he is pleased with Lanier's performance. While revenue has been flat for the first six months of fiscal 1987, the firm has remained profitable.

"With growth slowing on an industrywide basis, I'm proud that we're profitable," he says.

Like most computer industry firms, Lanier is operating in a cost-containment mode, Cantrell adds, stretching resources and limiting expenditures to maintain a healthy bottom line. For fiscal 1987, Cantrell says he expects financial performance to approach last year's profit of $18.4 million on revenue of $428 million.

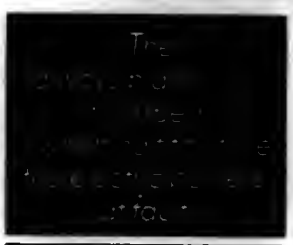
Wesley E. Cantrell

"No one expects a bubble up in the economy or increased industry growth," Cantrell comments. "Since we don't see a recovery in the business, our goal is to at least beat the growth rate of the businesses we are in."

To do that, Lanier is restructuring its sales force to address specific key markets while maintaining its traditional market-driven approach to product development. The firm is confining itself to serving the office worker — primarily executives and secretaries — by offering a mix of workstations, dictation and telephone equipment and vertical-market application software requested by its customer base. This plan has helped the firm

Continued on page 99

CONFESSIONS OF A DOWNED COMPUTER.



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Export rules cost U.S. billions

BY KATHLEEN GOW
SPECIAL TO CW

WASHINGTON, D.C. — A recent report from the National Academy of Sciences (NAS) has blamed the U.S.'s stringent export regulations for the loss of $9.3 billion worth of trade and 188,000 jobs in 1985.

"For years, our companies have realized that many export controls are costing us billions of dollars without really increasing national security," said Vico E. Henriques, president of the Computer and Business Equipment Manufacturers Association (CBEMA), based here.

"We force customers in Western countries to go through so much red tape to buy computers and business equipment from us that they are turning to vendors in other countries," the CBEMA chief maintained.

Both CBEMA and the Washington, D.C.-based American Electronics Association supported the findings and recommendation made in the NAS report, entitled, "Balancing the National Interest: U.S. National Security Export Controls and Global Economic Competition."

Armed with research conducted during an 18-month period, the NAS panel found that recent changes in U.S. export policy may be "overcorrecting" previous weaknesses by failing to promote both military security and economic vitality. It also found that export control policies lack proper direction and affirmative leadership at the executive branch level.

The panel concluded that the complex export control system unnecessarily hinders high-technology exports to other non-Communist Bloc countries and directly affects relations with members of the Paris-based Coordinating Committee on Multilateral Export Controls (Cocom).

The $9.3 billion figure was broken down as follows:

- Administrative costs to firms: $500 million.
- Lost West-to-West export sales: $5.9 billion.
- Lost West-to-East export sales: $1.4 billion.
- Reduced research and development: $500 million.
- Actual value of licenses denied: $500 million.
- Lost profits on export and foreign sales: $500 million.

The loss of jobs was figured at 25,800 jobs for every one billion dollars of exports lost.

The congressional Joint Economic Committee also supported the NAS findings, reporting that 1986 was the first year the U.S. posted a deficit for high-technology trade, with exports dropping to $2.6 billion less than imports. In 1980, U.S. exports exceeded imports by $27 billion.

The NAS study recommended the following policies be instituted:

- Elimination of licensing requirements for products that contain low levels of technology.
- Elimination of re-export controls on products destined for shipment within Cocom countries.

Continued on page 99

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MCC elects TI exec Dove to head firm

BY ALAN J. RYAN
CW STAFF

AUSTIN, Texas — Grant A. Dove, a 28-year veteran of Texas Instruments, Inc., has been elected chairman of the board and chief executive officer of the Microelectronics and Computer Technology Corp. (MCC) research consortium.

The election, held earlier this month by the MCC board of directors, places Dove in a consulting position to the 20-member consortium until his retirement from TI in July. At that time, Dove will assume full responsibility of MCC. He replaces Admiral Bobby R. Inman, who vacated the post in December. Joseph Boyd, chairman of the board of Harris Corp. will continue to serve as MCC's interim chairman and CEO until July 6.

"MCC's concept of obtaining substantial leveraging of individual shareholder's R&D investments is still a relatively new one for the U.S.," Dove said. "I consider it very important that we prove this concept to be a viable approach to improving our competitiveness.

"I am excited about the challenge of creating and transferring first-rate technology to a diverse group of leading U.S. corporations," Dove added. MCC is owned by 20 U.S. technology corporations.

Dove, who joined TI in 1959, is currently executive vice-president of the company. His duties have included managing the company's geophysical exploration service, data systems group and industrial systems division.

"Dove was the superior choice to guide MCC through its continuing maturation and evolution," said John Lacey, executive vice-president of Control Data Corp., who headed up the selection committee for MCC.

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For more information, contact Ed Marecki, Vice President/Sales, Computerworld Focus, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700. Or call your local Computerworld sales representative.

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FROM PAGE 93

make inroads in the legal- and medical-office markets.

"We run all of it through a screen and find out what products we need," Cantrell says.

"This approach allows us to go out and acquire products we are not developing internally," he adds.

Using that approach, the firm successfully penetrated the telephone market by procuring less costly dictation and telephone equipment from Japan, Cantrell acknowledges.

Lagging behind

One area where Lanier apparently lags behind is desktop publishing systems.

The firm, however, says it intends to make amends.

"It's a natural market for us in that it is an evolution of a word processing application," Cantrell explains. "We're close to making a decision on what we should do."

Export

FROM PAGE 96

- Legislation to speed the process of determining foreign availability, or whether a product is available on the international market outside the U.S. from non-U.S. sources. If so, the U.S. product would be granted a license within 20 days.
- The application of bulk distribution licensing procedures for shipment to the People's Republic of China.
- Procedures to cut average license processing time by one-third — to 14 days.
- Improvements in the way disputes are handled between the three controlling agencies, which are the departments of State, Commerce and Defense.

'Gone too far'

Secretary of Commerce Malcolm Baldrige, who recently announced an 11-point plan to initiate a less-restrictive policy, agreed that "we've gone too far" with controls that were originally intended to safeguard national security.

Baldrige noted that as much as 40% of U.S. merchandise shipped to allies now requires an export license.

Baldrige maintained that the plan will reduce license applications by 20% from their present level of approximately 120,000 a year.

This, the administration hopes, will help reverse the trend of foreign customers moving away from U.S. products, a process Baldrige has termed "de-Americanization."

Gow is editor of the CW Communications International News Service.

AT&T picks partner in FTS bid

Computer Sciences proposes billing system for government service

EL SEGUNDO, Calif. — AT&T has enlisted Computer Sciences Corp. to join in its bid for the federal government's $4.5 billion Federal Telecommunications System (FTS) 2000.

Computer Sciences' role will be for the design, development and maintenance of a software system to handle billing of FTS 2000 customers for AT&T's network services. The contract, to be issued by the General Services Administration, is for a digital telecommunications system to replace the U.S. government's existing FTS.

Computer Sciences is a major supplier of computer and communications systems and services to the federal government, deriving more than $600 million in revenue annually from the government, the company said.

The coveted contract, also receiving bids from teams led by MCI Communications Corp. and U.S. Sprint Communications Co., is expected to be awarded by the end of this year.

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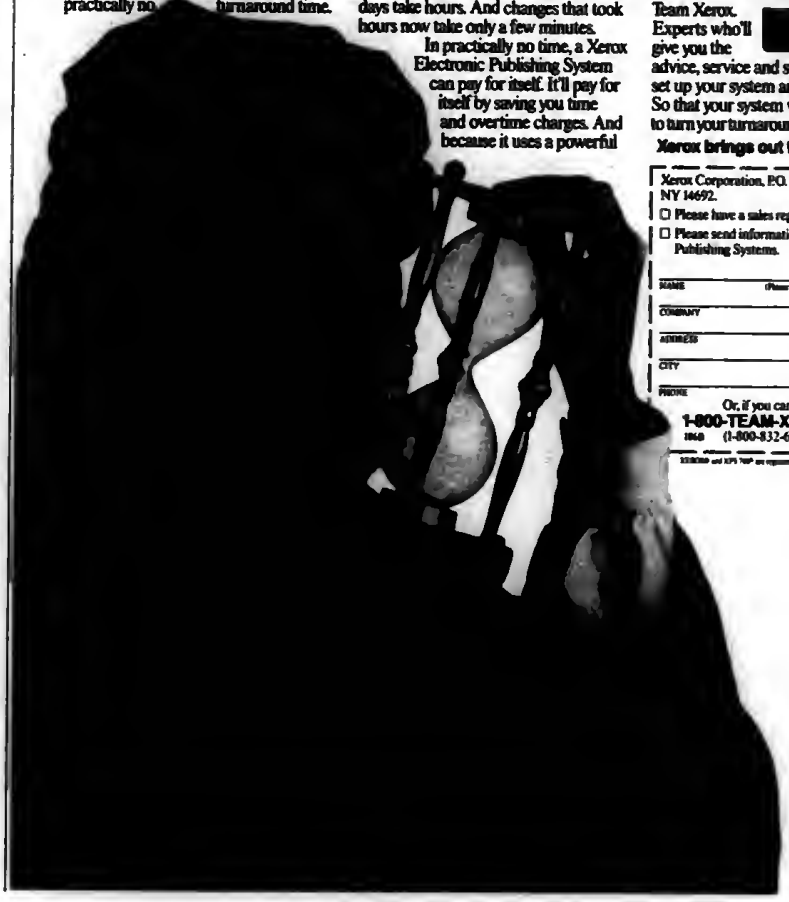

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IBM recruits

CONTINUED FROM PAGE 89

plementary resources for IBM's insurance industry group in Valhalla, N.Y. "But our customers need good, solid applications, and Syntelligence has tremendous ones."

Syntelligence, founded in 1983 in Sunnyvale, is a private company with a sales force of 10. The firm offers two artificial intelligence software products, The Underwriting Advisor for the insurance industry and The Lending Advisor for financial institutions. Both will be jointly marketed by IBM and both run on IBM's MVS/XA mainframe operating system.

The Underwriting Advisor utilizes cooperative processing betweeen the mainframe and the IBM 3270 Personal Computer workstations. Introduced in October 1986, the system is in use at American International Group, The St. Paul Companies and Fireman's Fund Insurance Co.

IBM is feeling competitive pressures from mid-range computer vendors such as Digital Equipment Corp. and does not have a strong applications software presence in the insurance and commercial lending markets, analysts said. In addition, Syntelligence claims to have the only full-function expert system IBM mainframe application, providing Big Blue with a strong application solution to offer customers and potential hardware buyers.

"IBM would like to sell more hardware, and we have applications that go into areas they haven't sold much in before," said Sheldon Breiner, president of Syntelligence. "We'll help them sell hardware, and their name will get us audiences we wouldn't have otherwise."

In addition, small firms like Syntelligence do not have the marketing clout or channels of distribution of an IBM. IBM, in exchange, is seeking to enter various vertical markets, and joint marketing agreements offer an inexpensive means to do so. The IMAP agreements with Syntelligence and Columbia, S.C.-based Policy Management do not limit the two companies to an exclusive IBM relationship and allow them to maintain individual marketing rights.

By contrast, IBM signed a more binding OEM agreement last year with Dallas-based Hogan Systems, Inc. [CW, May 12, 1986], under which Hogan forfeited domestic marketing rights to IBM in return for royalty payments.

Just how much these agreements will help both parties remains to be seen, however. Jointly marketing Syntelligence software will make little impact on IBM's bottom line, while the level of Big Blue's energies in these agreements has been questioned by some analysts.

"But no matter what," said Patricia Laupheimer, vice-president of research at Shearson Lehman Brothers, Inc. in New York, "it certainly doesn't hurt a company like Syntelligence, which sells software only to IBM customers, to have IBM's stamp of approval."

Commercial use

CONTINUED FROM PAGE 89

puters away."

Cray has installed seven supercomputers in Japan in commerical businesses. The firm has not had any success in cracking the government and university markets there because of its inability to respond quickly to the specific technical requirements of those institutions.

Ewald was emphatic that if a U.S.-Japan trade agreement is not reached, U.S. protectionism may be the only answer. "Either the Japanese are going to have to open up their market or we'll have to close down the U.S. market," he said.

Amdahl Corp. Amdahl, which remarkets Fujitsu-built supercomputers in North America and Europe, has had difficulty penetrating the domestic market, according to Wayne McIntyre, director of scientific systems. The firm, which has maintained strict compatibility with IBM 370 architecture, has shipped only four supercomputers, all to European firms in petroleum industry-related businesses.

The firm has had a hard time making the adjustments necessary to sell supercomputers in the U.S., he said. In the IBM plug-compatible mainframe business, Amdahl deals with personnel who make computer acquisition decisions. In selling supercomputers, scientists and researchers make the systems choices.

"We're still going through the learning process," McIntyre said. "We've done some things recently which should lead to some success here."

ETA Systems, Inc. The Control Data Corp. supercomputer spinoff cancelled its presentation at the conference, citing "a last-minute business change," analyst Gary Smaby of Piper, Jaffray said.

Sources said the firm's absence coincided with moves to bring ETA back into the CDC corporate fold and reports that the firm would not reach its projected goal of shipping between 10 and 14 of its ETA-10 next-generation systems this year.

Steve Hemping, ETA's vice-president of administration, said the firm did not appear at the conference because its president, Lloyd Thorndyke, was in Europe working with five customers.

Hemping declined comment on this year's projected shipments of the ETA-10, saying the St. Paul, Minn., firm has never publicly presented a delivery schedule. "We shipped our first computer to Florida State University in December. By mid-year that system should be fully operational. Then we'll talk about projections and orders and so on," he said.

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U.S. lagging

CONTINUED FROM PAGE 89

Technology Corp. never thought of developing a cooperative research program on communications protocols.

- Multinet, a Cebit-sponsored, mix-and-match network of products from 19 computer and communications vendors linked by the Transmission Control Protocol/Internet Protocol communications standard. Participating vendors included Apollo Computer, Inc., DEC, Data General Corp., Hewlett-Packard Co., Bull, Unisys Corp. and Siemens AG.
- A notably IBM-less electronic mail demonstration by the OSI Electronic Mail X.400 Group, which included several of the same vendors as Multinet. The group's purpose is to promote practical office applications of technical standards developed by Europe's Standards Promotion and Application Group.

As always seems to be the case when the initials IBM and OSI appear together, corporate politics reared its ugly head when IBM did not join the OSI electronic mail demonstration. Some IBM spokesmen said Big Blue wasn't invited; other vendors disputed that. "I wonder why IBM chose to do it this way," said Klaus Kemmler, marketing manager of DEC in West Germany. "They didn't do themselves a favor."

Nonetheless, most European computer executives feel that U.S. computer vendors will ultimately embrace OSI communications standards.

"I think they will have to, because of market and customer pressure," said Bull President and Chief Executive Officer Francis Lorentz, whose Paris-based firm will finalize the terms of its acquisition of controlling interest in Honeywell, Inc.'s computer business by the end of this month.

"Users are playing a much bigger role, and it is becoming an important issue to work with international standards," Lorentz continued. "Users do not want to be stuck with one manufacturer's standard. They cannot afford to take that risk. IBM's Systems Network Architecture won't disappear, but IBM will have to develop gateways to OSI, and they won't be as efficient as native implementations," he added.

Lorentz theorized that fourth-generation languages and data base standards such as the SQL interface will become much more prominent as users move to distributed software applications. "In five years, the user may no longer know or care what mainframe or what operating system the application is running on," he said. "It's like comparing cars — the gas and the gearshifts are the same, even though the engines are different."

Because of the peculiar characteristics of the European computer market — with many vendors dominant in their native country and not even a market factor in others — it has historically made a lot of sense for European computer makers' products to talk to incompatible machines made by others. And admittedly, even in Europe, standards like OSI still have a long way to go.

But large U.S. computer users, awash in a sea of incompatibility, have a lot in common with their European counterparts who have been victimized by a fragmented industry. U.S. vendors would do well to take a lesson from across the Atlantic and get the connectivity standards ball rolling much faster than it is now.

Wilder is *Computerworld's* senior editor, computer industry.

GTE, Fujitsu

CONTINUED FROM PAGE 89

PBX in the U.S. have been slowed by fierce competition and lackluster growth of the market, Kennedy said. The Gartner Group estimates that the U.S. PBX market is only growing 5% annually, and AT&T, Northern Telecom, Ltd. and IBM's Rolm Corp. control about 70% of it. "All the majors have lost money in the PBX market, and it doesn't look like things will get better," Kennedy said.

For Fujitsu, the GTE venture continues the firm's recent flurry of activity to expand its U.S. market presence. Fujitsu America has three divisions, five U.S. subsidiaries and five U.S. manufacturing plants.

"It looks like Congress may get very aggressive on limiting Japanese imports," Kennedy said. "Japanese companies can get around that by buying into U.S. firms to make or distribute their products here. NEC Corp. has also done that very successfully."

Cullinet

CONTINUED FROM PAGE 89

they saw and didn't want to spend the time developing it," said Stefan Bothe, president of Computer Associates's application software division.

According to Bothe, the agreement stipulates that Cullinet will sell the fixed asseta system in conjunction with its software only. Computer Associates is expected to continue to sell the package with its other financial software programs or as a stand-alone offering, which Cullinet is not allowed to do.

Separately, Cullinet will work with data collection equipment vendor Epic Data Corp. to bundle and jointly market Cullinet's CIM software and Epic Data's hardware.

EMPLOYMENT TODAY

Employers want MIS degrees

But there's room for experienced professionals without college education

BY ROSE MULA
SPECIAL TO CW

If you did not have the means or the foresight to obtain a degree in data processing or the good fortune to choose the right company early in your career, all is not lost.

Many companies are looking for MIS professionals with solid on-the-job experience, even if they do not have formal training.

"Sure, an employer's first choice is a candidate with a computer science or MIS degree, in addition to three to five years experience; but when pressed, they will give equal consideration to nondegreed applicants with equivalent experience," says Patricia Perrilo, a consultant for R. F. Hammond & Associates, a Lexington, Mass., placement firm.

That's the good news. The bad news is that "equivalent experience" usually means two years of work for every year of college.

"Like everyone else, we prefer a mix of education and experience," says Nan Heisler, human resources manager for North American Life & Casualty Co. in Minneapolis. "But, if we have to choose between a recent college graduate and a nondegreed, experienced candidate, we generally choose the person with experience and then take responsibility for developing his or her education through comprehensive, in-house training and tuition reimbursement."

North American Life & Casualty does not necessarily require DP experience, Heisler says. "Again, if we have to make a choice between two candidates, we prefer a general business background over programming experience," she adds.

Another company that looks for a business background as well as DP experience is Digital Equipment Corp. According to John Hopkins, DEC's strategic planner for human resources management, "in the future, the best information systems will be those that are designed, developed and implemented by users who understand computer science, as opposed to computer scientists who have no firsthand knowledge of the user environment.

"A technical or business degree is a definite asset, but even more important is an attitude of lifelong learning," Hopkins adds.

To be successful, MIS professionals should understand changing technologies and the merger of diverse technologies in the future. The only way to keep abreast of these developments is to continue to learn and broaden your skills, Hopkins suggests.

In the health industry, professionals with a mix of education and experience are also in demand. Advanced System Applications, Inc. (ASA), a Bloomingdale, Ill., developer of software systems for the industry, recruits between 50 and 75 people a year from colleges, as well as a number of nondegreed people with three to five years of experience, according to Trudy Norman, the company's director of corporate recruitment.

Although ASA employees get first crack at new openings before a search is extended, there are many slots that are filled by outsiders.

"In any given year, one-third of our employees are promoted to higher levels," Norman says. "But because we've been growing at a rate of 50% annually, it's impossible to fill all new openings internally."

For managerial slots, from the director level on down, ASA looks for people with people handling skills as well as several years of experience in either group health or DP. In cases in which the applicant does not have formal training, Norman says, she tends to weigh experience more heavily than a degree.

Despite the attitude of employers like ASA, many other companies still regard a degree as the passport to consideration for job applicants, according to Steven Comstock, a Denver DP instructor who conducts seminars for companies worldwide.

"Today, in most cases, you need a degree just to get hired. That's too bad, because I've met a tremendous number of extremely competent programmers and managers who don't have degrees; but it's getting harder and harder to get your foot in the door without one," Comstock says.

The reason for this situation is that the market is becoming saturated with people with bachelor and advanced degrees, says Dennis Hill, chairman of the Milwaukee School of Engineering's Computer Science and Engineering Department.

"Because of this saturation, nondegreed individuals new to the job market will have a very difficult time getting placed; and those already working will find themselves stratified at lower levels or even displaced," he says.

To avoid that fate, MIS professionals can either go back to school full-time or attend continuing education classes, Hill adds.

"People in dead-end jobs should not resign themselves to their fate, justifying their nonaction by moaning, 'It's no use; I don't have a degree.' Education is an ongoing process. It doesn't have to stop at 21," Hill says.

Hill recommends pursuing courses of study that address both hardware and software development. "Our placement records show that companies are seeking candidates who can offer that flexibility," he says.

R. F. Hammond & Associates' Perrilo also advises nondegreed people to take continuing education courses, with the emphasis on MIS.

"MIS specialists aren't dependent on any particular industry," she says. "If one goes into a slump at any time, you can switch to one that is prospering."

> "PEOPLE in dead-end jobs should not resign themselves to their fate, justifying their nonaction by moaning, 'It's no use; I don't have a degree.' Education is an ongoing process. It doesn't have to stop at 21."
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Software Engineers Multiple openings for BSEE's with a minimum of two years experience in Software Engineers. Openings in signal processing, microwave, radar, satellite communications, electro-optics, power supply, inertial navigation and image processing. Experience with VAX 11/7XX, PDP 11/XX, FORTRAN, ADA, PASCAL and/or ASSEMBLER sought. Phoenix. ***To $52,000.***

Programmer/Analysts Rapidly expanding Phoenix-based consulting firm seeks Consultants with strong IDMS, ADS/O backgrounds. COBOL and CICS experience in an OS/MVS environment desired. Top salary and benefits with excellent growth potential. ***To $34,000.***

Programmer/Analysts New data center with extensive new development is seeking Programmer/Analysts with strong exposure to COBOL or PL1 and ADABAS. Ground floor opportunity. ***To $37,000.***

Colorado

Programmer/Analyst—Insurance Develop new systems in an on-line, data base environment. Denver-based corporation seeks skilled professionals with a desire to join a fast-paced organization working with IMS and CICS. Life insurance applications experience preferred.
To $32,000.

CAD/CAE Software Engineers Automation firm seeks talented, ambitious professionals for the development of operating systems, LANs and color graphics. Three years block structured language experience in a commercial environment desired. PASCAL, C, UNIX and hardware design preferred. ***To $45,000.***

VAX COBOL—New Development Two years VAX COBOL experience with a strong preference for layered products: DBMS, TDMS, ACMS desired. Advancement and career growth are determined by your performance and initiative. ***To $37,000.***

DB2—Multiple Openings Growing multi-billion dollar corporation seeks professionals with DB2 and/or IMS/DC experience in a large scale IBM MVS environment. Be a part of a long-term development project. ***To $50,000.***

VAX Technical Support Expanding organization has opportunities for VAX DBAs and Software Specialists. Heavy user interface. Advance your technical skills in this state-of-the-art environment. ***To $50,000.***

Software Engineer—Aerospace Join a small development team and work with large data base systems. Environment includes IBM, DEC VAX systems with multiple software tools. Security Clearances (EBI, SBI) highly desirable.
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Programmer/Analysts—IBM Expanding Denver-based corporation seeks multiple Programmer/Analysts to support and develop on-line and data base systems in an IBM MVS environment. Financial, inventory and order processing applications experience preferred.
To $40,000.

Technical Support—Data Base Highly successful DBMS vendor seeks a motivated professional to provide pre-sales product support. Will interface extensively with people which includes seminars, demonstrations, benchmarks and installations. Regional travel to 30%. VAX/VMS expertise and five years of large-scale data base design desired.
To $40,000 plus bonus.

IMS—New Development Large Denver-based financial services firm seeks professionals for a major development effort. This is a stable, well-managed company with good career growth opportunities. Three years of IMS DB/DC programming and design experience sought. ***To $32,000.***

Test Engineer—Software Several openings exist due to an exciting, long-term project. Three years of validation and verification experience sought. VAX experience a plus. EBI, SCI or SBI Clearance highly preferred.
To $50,000.

Systems Programmers One of Denver's most advanced data centers has exciting projects for System Programmers with a background in any of the following: MVS, VTAM and/or CICS.
To $47,000.

Southern California

Project Manager—Loans Suburban San Diego company seeks a manager to supervise the modification and installation of a major loan system. ***To $60,000.***

Software Engineer—High-Technology Major manufacturer located in suburban San Diego seeks motivated Microprocessor Software Engineers with three years of real-time software design experience on Intel 8080, Z-80 or Motorola using Assembler, C or PLM. BSEE or Computer Science degree considered a plus.
To $45,000.

Analyst—Communications Growing San Diego government consulting firm needs people experienced in secure communications or verification and validation. ***To $45,000.***

Real-Time Control Programmers—San Diego firm has a multi-year project to create real-time control systems to monitor nuclear energy facilities. Experience with drivers/handlers, data acquisition and control systems on 16-bit microcomputers using assembler language desired. ***To $45,000.***

Systems Analyst—IDMS Major San Diego MIS group needs an Analyst to support IDMS applications. Heavy interface with data base support group. ***To $38,000.***

On-Line Programmers—OS Environment Major San Diego-based organization has several openings for On-Line Programmers to participate in a system utilizing a large network of terminals tied to one of IBM's largest computers. Selected candidates will work in an OS/MVS CICS, IMS environment.
To $40,000.

DEC VAX System Programmer Northern San Diego software company seeks a professional to manage and tune their VMS system. Will interface with Applications Programmer and assist in training. ***To $45,000.***

Analysts—Insurance Due to expansion, a San Diego-based insurance company seeks twelve Analysts and Senior Programmers. Outstanding facilities. ***To $40,000***

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Office Automation Consultant Gulf Coast employer seeks a professional with a background in end-user computing and experience with office automation or word processing products. Will work in an information center environment and be exposed to the latest 4th generation products on micros, minis and mainframes. Good verbal and written communication skills and a 4-year degree desired.
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PICK Programmers—New Development Team Expanding Houston-based organization is experiencing an increase in business, creating a need for experienced professionals with three or more years of Basic Programming in a Pick operating environment.
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Software Engineers Your five years of technical experience and extensive knowledge of a DEC VAX environment will qualify you for this outstanding opportunity. Hands-on experience with any of DEC's layered products and a systems management background desired. ***To $55,000.***

System/Analysts—Multiple Positions Fortune 100 company headquartered in Houston seeks several System/Analysts for project leadership roles. Four years applications development experience in a business environment sought. Strong COBOL or PL/I coding skills with IMS, a degree and the ability to interface with users desired. ***To $45,000.***

Software Engineers World leader in the design and manufacture of energy management and SCADA Systems seeks several Software Engineers to help in the development of new projects. Two or more years of power system development utilizing FORTRAN in either IBM or Sperry environments desired. New Houston facility. ***To $45,000.***

Data base Administration Specialist Outstanding firm located on the Gulf Coast seeks a professional to take charge of the entire data base function. A thorough understanding of data modeling, data structures, control procedures and excellent communication skills are desired. This is your chance to set-up the data base function your own way.
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Financial Programmer/Analyst New Orleans financial institution seeks an individual with two years COBOL programming experience in either loans or banking applications in an IBM mainframe environment.
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Senior System Analysts OS/MVS/XA data center located in Alabama seeks two Senior Systems Analysts with solid CICS and COBOL programming skills for project leadership positions. Manufacturing and/or financial applications development experience would be a plus. ***To $36,000.***

Data Center Expansion—Multiple Positions Increased business demand necessitates an upgrade to an IBM mainframe data center, creating the need for Programmer/Analysts, Systems/Analysts and a Technical Services Manager. Houston location.
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Software Engineer Technology Leader Dallas office of a Fortune 500 firm seeks a Software Engineer to develop microcomputer software on PC's for programmer productivity. Development will be done in C. New facility in a campus-like setting. ***To $41,000.***

Programmer/Analysts—IMS DB/DC Projects Corporate staff of a rapidly expanding Dallas Fortune 500 organization seeks experienced professionals with strong OS/COBOL backgrounds. All application projects are new and involve IMS DB/DC development.
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CAD/CAM—Software Developer North Dallas manufacturing firm which develops VAX and Micro CAD/CAM systems for new products seeks a software professional with PASCAL or C and VAX exposure. ***To $33,000.***

Data Base Analysts Corporate Headquarters of a national financial leader in Dallas seeks a management-oriented IMS DBA Analyst for long-term development projects. Data modeling experience highly desired.
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Lead Systems Programmer—CICS or IMS Major Dallas-based energy firm seeks an OS/MVS Systems Programmer with either CICS or IMS expertise to supervise a small group of technical support software people. New facilities and excellent growth potential.
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Programmer/Analysts—On-Line Project Transactions On-line and data base-oriented project is moving into the coding and implementation phase creating a need for Programmer/Analysts. Good CICS skills preferred. COBOL acceptable. Dallas location.
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Information Center Manager Growth-oriented organization in Dallas seeks a Manager with information center experience and expertise in PC's and LAN's. The ability to work with personnel is a must. ***To $45,000.***

Programmer/Analyst—Industry Leader This Oklahoma-based company is number one in its field and is undergoing rapid expansion. Two or more years of COBOL experience combined with either IMS or IDMS desired. Excellent promotional opportunities.
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Programmer/Analysts—Major Expansion Tulsa corporation seeks professionals for new development projects. One or more years experience programming in COBOL or PL/1 and IMS DB/DC desired. ***To $40,000.***

Programmer/Analysts—IMS DB/DC Projects Data Center of a rapidly expanding Tulsa Fortune 500 organization seeks experienced professionals with accounting application experience using IMS DB/DC.
To $40,000.

Programmer/Analyst—Multiple Positions Successful Tulsa firm seeks a professional with knowledge of C or PASCAL on a VAX/VMS system. Candidates with programming experience using C on PC's will be considered. ***To $40,000.***

Programmer/Analyst Tulsa firm seeks professionals for a development project in real-time interactive on-line process control systems. Two years using DEC Assembler on process control systems desired. ***To $45,000.***

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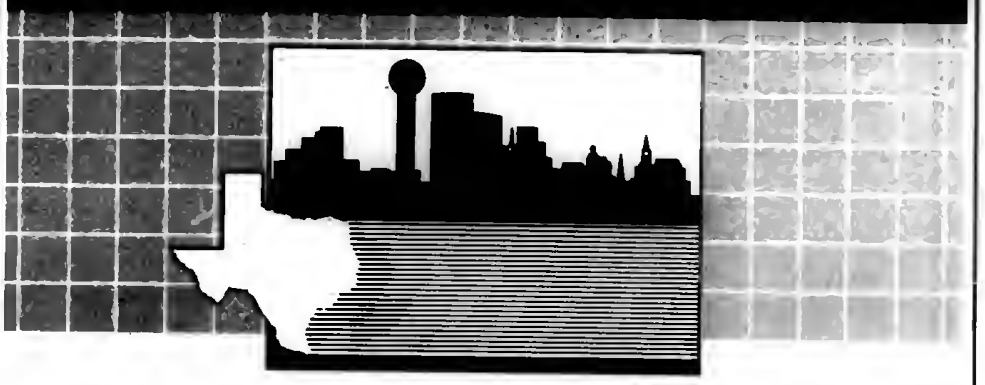

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This position requires a minimum of five years experience supporting hardware and software in a SNA environment. Responsibilities will include network design, performance, measurement tuning, VTAM, NCP generation and new product evaluation.

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COMPUTER SCIENCE DEPARTMENT

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Indiana University of Pennsylvania invites applications for Assistant Professor (tenure-track) to teach undergraduate or graduate courses in Computer Science including entry level and advanced courses with emphasis in the area of Data Communications.

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Send application, resume, transcripts and three references to Mr. Gary Butterbaugh, Chairman, Computer Science Department, Indiana University of Pennsylvania, Indiana, PA 15705. Telephone (412) 357-2524. Review of applications will begin April 1 and continue until position is filled.

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We also will have a need for the following professionals:

- **User Services Manager**
- **Systems & Programming Manager**
- **Manager Data Administration**
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If you are seeking career advancement in the data processing profession, then talk to us. We are former computer professionals who have counselled and placed hundreds of computer professionals like yourself in the 17 years since our founding in 1970. To inquire about numerous Atlanta, Dallas, Southeast and Southwest opportunities, send your resume or call us today! **DataPro Personnel Consultants, 400 Perimeter Center Terrace-Suite 650, Atlanta GA 30346. (404) 392-4242, or 12720 Hillcrest - Suite 520, Dallas TX 75230. (214) 991-0900**

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Exceptional opportunity for a Programmer Analyst to excel and grow with this leader in health care. We are a 170 physician multi-specialty clinic.

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Our environment features an IBM System 38 Model 40 RPG III. If you have two plus years experience in an online real time environment and want to be a part of this dynamic, aggressive, growing corporation, send resume to:

Guthrie CLINIC, Guthrie Square,
Sayre, PA 18840, Attn: Personnel Director

Computer System Engineer - Analyze, plan and modify transaction processing facility (TPF) systems including communication hardware and software. Provide support for communication protocols and message switching areas including 3705. Assembler. Requires travel to client job sites and a Bachelors Degree and/or equivalent education and experience in systems analysis or data processing. $60,000 per year. 40 hours per week. 4 years experience required. Education and experience will be found acceptable if applicant has the minimum of a high school diploma and in access of 1000 hours of professional development courses (equivalent to or least 2 years of US college level studies) in addition to 6 years of work experience in a professional level in systems analysis or data processing. Contact Oklahoma State Employment Service, 3105 E. Skelly Dr., Tulsa, OK 74105. JO # 090844

Programmer Analysts

Rewarding career opportunities await individuals possessing two years of solid programming experience and good analytical skills. Experience with VAX/VMS and VAX/COBOL is required. A background in insurance would be helpful. You will be located in one of the more desirable small college communities in the entire country. Within easy driving distance to several metropolitan areas. We offer a very competitive salary and benefits package. Send resume and salary expectations to:

Assistant Personnel Director
Grinnell Mutual Reinsurance Company
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PROGRAMMER. Assists in the review & analysis of previously defined program specs. Prepares program flowcharts & codes program instructions. Assists in the prep of test data. Tests & develops programs. Prepares program documentation. JCL & helps the client put jobs into production. Works on several phases or programming w/specific direction. Estimates tasks assigned & reports progress against schedule to project leader. Must have 2 yrs exp in job or 2 yrs exp as Computer Operator/Programmer. Must have exp using PL1, w/JCL & IBM hardware. 40 hrs/wk. $33,550/yr. Send resume to: Illinois Dept of Employment Security, 401 South State St. 3 South, Chicago, IL 60605. Attn: Joan Haight, Ref #57631, An Employer Paid Ad.

SYSTEMS ANALYST AND ANALYST/PROGRAMMER

Simpson Paper Company, a progressive pulp and paper manufacturer whose Corporate MIS group is located in Northern California has multiple vacancies for Systems Analyst and/or Analyst/Programmer. Duties include design, development of systems and procedures and implementation of a full range of applications on IBM 4361 under DOS/VSE SP and CICS with multiple decentralized IBM System 36s running Batch and RJE. Positions require 5 years proven successful track record in COBOL and RPGII as well as Bachelor's Degree in Computer Science or Business or equivalent experience. Must have solid CICS experience and working knowledge of Total/Manis a plus. These positions offer opportunity to participate in all phases of MIS functions and may involve travel to various manufacturing locations. Send confidential resume to:

Director of MIS
Simpson Paper Company
P.O. Box 637
Anderson, CA 96007

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Systems Engineer for manufacturer located in southern Ohio to work on computer-based monitoring system designed to monitor electronic devices. Duties include software and hardware design, design of testing criteria, testing and debugging, integrating software programs and codes with hardware and monitoring product field test installation to resolve software bugs and inconsistencies. Requires M.S. degree in computer engineering and one undergraduate course or programming language/Micro 80, 85 and one academic graduate course each in Data Structure, coding theory, Computer Architecture, Operating Systems, Microcomputer Hardware and Computer Graphics and Computer Design. No experience required. 40 hrs/wk. $30,000 yr. Qualified applicants reply immediately with resume to: M. Rush, J.O. #0885953, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

M.I.S. PROJECT LEADER

Columbus, Ohio

At **Ashland Chemical**, MIS plays a key part in progress. As a result of upgrading our information system capabilities, we are seeking a Project Leader to participate as a member of a new development team in an IBM mainframe/TSO environment.

This multi-disciplinary team will concentrate on enhancement, integration and installation of package software, as well as development of major new applications, with full project-cycle responsibility from detail design and programming through testing, documentation and system conversion.

This position will be responsible for various software package modifications and installation in a chemical manufacturing and distribution environment. Requirements include a minimum of seven (7) years of data processing experience, one to three (1-3) of which must have involved project lead responsibilities for analysis, design, development and project control. System experience should include at least three (3) of the following: sales order processing, inventory control, purchasing, engineering records, production scheduling/control, MRP and product costing.

In addition to the above experience, this position requires knowledge of COBOL (PL/1 acceptable), TSO/SPF, IMS DB/DC, BTS, LIBRARIAN, and a college degree emphasizing a strong academic performance.

We offer you an exceptional career setting in the $1.5 billion chemical-products division of Fortune 50 leader, Ashland Oil, Inc. Compensation includes competitive salary and broad benefits coverage. For confidential consideration, send resume or letter of qualifications, including salary history to: **Ms. Uffa M. Brown, ASHLAND CHEMICAL COMPANY, P.O. Box 2219, Columbus, OH 43216.**

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CAREER OPPORTUNITY

Senior-level VAX/VMS system manager for site with VAX cluster and multiple MicroVAXes. DECnet local and wide-area network management as well as knowledge of high-level programming languages required. Unix, X.25, and TCP/IP experience a plus.

Excellent salary and benefit package. Interested candidates should forward resume to:

Personnel Manager
Research & Development Center
Dowell Schlumberger Incorporated
P. O. Box 2710
Tulsa, Oklahoma 74101
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Assistant Data Processing Manager

Assistant Data Processing Manager responsible for coordination of new and existing systems, manufacturing and financial. Knowledge of System 38 hardware, RPG III programming, S/38 CPF and 5 years experience. Send resume with salary history to:

Personnel Department
Chicago Faucet Company
2100 South Nuclear Drive
Des Plaines, IL 60018

Programmer Analyst - analyses of procedures to refine and convert data to programmable form, determine output requirements, evaluate system effectiveness, upgrade systems, develop and implement new systems and programs, problem solving and system correction. Duties involve work with IBM mainframe computers, COBOL, CICS, VSAM and JCL under MVS & A. Degree in computer science, math or engineering and 2 yrs. in job offered or 2 yrs. combined experience as Programmer and Programmer Analyst working with hardware, languages, software and operating system listed above. D.O.T. 012167088. 40 hrs/wk. $32,000/yr. Send resume to: NYS Job Service, Order #8087111, 97-45 Queens Blvd., Rego Park, NY 11374.

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PROGRAMMER/ANALYST I - Entry level for business applications programmer to write and test programs. Must have working knowledge of COBOL, flow charts, perf charts, data base design charts and schemas and MPE commands. Four year degree in Business Information Systems, Computer Science or related field required, experience with HP/3000 helpful. Appropriate experience may be substituted. Apply to: New Mexico Institute of Mining and Technology, Personnel Department, Socorro, NM 87801. EOAAE.

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KERR-McGEE CORPORATION, a Fortune 200 Company, is seeking a computer systems Security Administrator to manage the planning, implementation and maintenance of a corporate wide automated security program.

The successful candidate should possess a minimum of 10 years MIS experience with two years recent experience in the administration of ACF2 security software controlled systems, must have systems development and/or technical support experience on large scale IBM computers, must have working knowledge of CICS, TSO, OS/MVS and COBOL, and must have well developed oral and written communication skills.

The incumbent will supervise the protection of the privacy and confidentiality of associated databases. In addition, the Administrator will develop and ensure the enforcement of the standards and procedures pertaining to all phases of computer security.

Qualified candidates should send resumes in confidence to.

KERR McGEE CORPORATION

DIRECTOR, INFORMATION SYSTEMS
MARY BALDWIN COLLEGE, STAUNTON, VIRGINIA

This position is responsible for all administrative and academic information systems activities on campus. The Director will be responsible for applications planning, development and implementation and MIS policies, procedures, budgeting and staffing. The Director will be responsible for the selection and implementation of a new administrative information system.

Current systems include an internally developed administrative system operating on a Data General MV 8000 and a packaged financial accounting system operating on an IBM System/38. Several academic packages also operate on the Data General computer.

Experience in systems development, computer operations, microcomputer selection and installation is required. A demonstrated ability to develop policies and procedures for an entire information systems organization is also required. The Director must be able to effectively communicate with both academic and administrative users, as well as the senior executive staff of the College. Knowledge of data base management and word processing systems is desirable.

Mary Baldwin College is a prestigious, private women's college of 1,000 students located in the beautiful Shenandoah Valley of Virginia. The College offers a competitive salary and liberal benefits package. The college overlooks the picturesque city of Staunton which has a hospitable climate and provides a semi-rural environment with a very reasonable cost of living.

Send resume and salary history to: Coopers & Lybrand, 7th & Franklin Building, Richmond, Virginia 23219, Attn: Mr. Robin Scott (804) 643-0234.

Manager of Applications Development

We are a well-established software development firm specializing in on-line financial systems for HP3000 and DECVAX computers. We seek a skilled project manager with heavy exposure to the following systems:

General Ledger
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A strong technical background is also required: HP3000, DECVAX, or C programming experience would be a plus. We offer a generous salary, profit sharing, and annual performance bonus, plus one of the most stimulating environments you'll find anywhere. Please send your resume, including salary history, to:

Mitchell Humphrey & Co.
3020 Woodhead Parkway
St. Louis, MO 63146

Programmer Analyst: Participate in the design and implementation of health care related computers based information systems for IBM mainframe computers, including IBM S/38 computer and utilizing RPG II and RPG III operating systems, coordinate systems specifications and user automation requirements, direct technical training programs with reference to IBM mainframe computers and operating systems software including RPG II and RPG III operating systems 4 yrs. college: B.S. in Mechanical Engineering or Computer Science 1 yr. experience in position or 2 yrs. experience as a Systems Engineer or Data Processing Business Representative. Experience in related occupation must include responsibility for installation, use, and programming of IBM S/38 mainframe computers and RPG II and RPG III operating systems. Applicants should send resumes to Job Service of Florida, 3421 Lawton Road, Orlando, Florida 32803, Attn: Phil Bardi. Reference #FL5725494. AN EMPLOYER PAID AD.

SR. SYSTEMS ANALYST – Responsible for sys analysis, using structured analysis techniques & sys design to produce sys specs & design docs. Responsible for mgmt of project sched & developm. supervy of programming team, liaison with end-users & ensuring that sys meets w/user requirements. Req knowl of all stages of sys implementation & project life-cycle, including establishment of the end environment, planning & executing the test & training client staff in sys test methodology. 5 yrs. or 5 yrs. rel exp. • Systems Analyst/Programmer: Must know: COBOL, CICS, RPG III, DATA-TRIEVE, VAX-VMS/FMS/UIMS/TELE, IBM System/38, VAX-11 hardware & IBM 4300. Must know test environments and methodology, systems analysis and design and structured programming techniques. $44,000/yr. 37½ hrs/wk. CAP Information Systems, Inc., 521 Fifth Avenue, 34th Floor, New York, NY 10175. Send resume.

IDMS SYSTEMS CONSULTANTS

Prestigious consulting firm needs your IDMS applications background for projects at client sites in St. Louis. If you have any IDMS both and on-line programming experience and a B.S. Degree in business, data processing, accounting or computer science you may be the model for this exciting opportunity. Great visibility to upper management and very good advancement potential. Call for more details. Salary to $40,000.

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(314) 727-1666

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- IMS
- DEC/VAX/FORTRAN
- CICS
- ADABAS/NATURAL

Send resumes to:

METRO
Information Services, Inc.
Attention: Kathy Beale •
Seven Parkway Plaza, Suite 140
Charlotte, NC 28217

Software Design Engineer

• Design and develop linguistic software for syntactic and semantic analysis of natural languages. Evaluate adequacy and applicability of output and need to reform/alter models. Design and test program logic. Programming is to be done in the C programming language working under the UNIX operating system. $30,000 per year, 40 hrs/wk, 8am-4pm. Requires MS requirements completed with strong mathematical background (at least 9 courses or 20-25 credits in college level math), experience in software development related to automated deductive systems, under the UNIX operating system and Master's thesis or comparable independent work in software design and development. Send resume to: Job Service of Florida, 105 E. Broward Blvd., Ft. Lauderdale, FL 33301. ATTN: Job Order # FL5201936.

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The Data Group
P.O. Box 52065
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SYSTEMS SUPPORT MANAGER (0253)

Salary range $27,487-$40,236 (plus 6% contribution to deferred compensation.)

Experienced Manager to oversee computer operations and systems programming, requires a solid technical background and management experience in IBM 4300, VM/CMS, DOS/VSE, CICS and ICCF. BS or BA in business, computer science, engineering, math or related field and six years experience or any equivalent combination of education and experience.

Position opened until filled. Targeted screening date April 5, 1987. Florida law requires all applications be subject to public review. Please submit your resume to:

Human Resources Dept.
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DATA BASE ANALYST

MSU System Services, Inc., the technical service subsidiary of the Middle South Utilities System has an excellent career opportunity for an experienced Data Base Analyst.

The position involves designing and implementing physical data bases for in-house developed applications as well as implementing and tuning package applications. This position requires a thorough knowledge of IMS concepts with at least three years experience performing DBD, PSB, MFS, and ACB gens. Knowledge of IMS utilities including reorganizations, recovery, and SMU II is required.

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MSU System Services, Inc.
P.O. Box 61000
New Orleans, LA 70161

1-800-231-4481

In Louisiana call collect (504) 569-4960

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Applicants should preferably be of Turkish nationality and have experience in managing software development teams, extensive knowledge of advanced programming techniques, with a minimum of five years' background in CICS programming.

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Director, Information Resources Management Department
GM-334-15

Salary Range: $53,830 - 69,976

The Pension Benefit Guaranty Corporation, a federal Corporation of about 500 employees with financial assets under management of about $2.3 billion, is seeking a Director of its Information Resources Management Department. The Corporation insures about 112,000 pension plans and processes benefits to about 94,000 individuals. This individual will serve as the Corporation's senior information resources official and as advisor to the Executive Director. The Corporation's information resource needs include financial accounting, decision support, word processing, micrographics, and telecommunication systems.

This position requires a background that demonstrates experience or knowledge in management and operations of information resources and technical expertise.

Applicants are to submit a SF-171, Application for Federal Employment, by COB April 8, 1987 to the address below:

Pension Benefit
Guaranty Corporation
Personnel Office, Room 3700
2020 K Street, N.W.
Washington, D.C. 20006-1806
RE: 87-37

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PROJECT LEADER & PROGRAMMER ANALYSTS

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The PROJECT LEADER will be responsible for the MSA General Ledger, Accounts Payable, Medical Records applications, and new Healthcare application development activities. This position supervises 3-4 programmer analysts, performs systems analysis activities, and will be required to do moderate program development work. The successful candidate will have a BS degree in Computer Sciences and 10 years progressively responsible programming experience. Cobol, VSAM, VM/CMS, DOS/VSE and a healthcare application background is required. Knowledge of the Datacare Patient Care System, Medipac Patient Accounting System, MVS or Command Level Cobol is highly desired.

PROGRAMMER/ANALYST must have 3 to 8 years progressively responsible programming experience. Specific knowledge of the Medipac Patient Accounting, or Datacare Patient Care software is required. Must be proficient in structured systems analysis and design, Cobol, VSAM, VM/CMS and DOS/VSE. B.S. degree in Computer Sciences, MVS or Command Level Cobol is highly desirable.

AMI offers competitive compensation and benefit packages. Please send resume, salary history, and references, in confidence, to Manager of Recruitment, AMI/Rocky Mountain Healthcare System, 1601 East 19th Ave., Denver, Colorado 80218.

EOE M/F/H

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FOR APPLICATION forms contact (509) 963-1202 or Personnel & Benefits, CWU, Ellensburg, WA 98926
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For more information, contact **Marie Clark at 1-800-521-2144 or send your resume to: M.I.S. INTERNATIONAL, Corporate Headquarters, 23300 Commerce Drive, Farmington Hills, MI 48024.**

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CHIEF PROGRAMMER/ANALYST. Work on Securities Process. Syst. project for major client of firm using IBM 3090 hardware in TSO/ISPF & IBM DB/DC environmt. Prep of prototypes & subsequent presentation to user & DP personnel. Involves analysis & use of TSO Dialogue Mgmt Svcs (DMS). Write specs of IMS trans. for programmers to code. Develop on-line programs using TELON (a COBOL applic. generator) which invol. a lg amt of native COBOL & DL/1 work. Write scripts for testing indiv. programs & entire components. Design, spec & code IMS Fast Path randomizer routines, written in Assembler w/heavy use of macros for error checking & table generation. Respons. also for developing this syst's interface w/ other bank systs which are primarily CICS DL/1 or IMS DB/DC. Must know COBOL, CICS, EDF, IBM JCL, ACF2, TSO/ISPF, IBM Assembler, NATURAL/ADABAS, IMS DB/DC, DL/1, DMS, Fast Path randomizer routines, TELON & IBM 30XX mainframes. Reqs: Bachelor's in Data Process or Computer Sci. 4 yrs exp or 4 yrs rel programming exp w/at least 2-3 yrs exp as Sr. Programmer/Chief Programmer. $50,000/yr. 40 hrs/wk. Send resume to: ACSIS, Inc., 110 William St. NYC 10038. (Indicate RR-400).

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April 27	T1 Equipment/Multiplexers	April 10
May 11	DEC-Compatible Software	April 24
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June 8	LANs	May 22
June 22	Printers — Line & Character	June 5
June 29	Accounting Software	June 12

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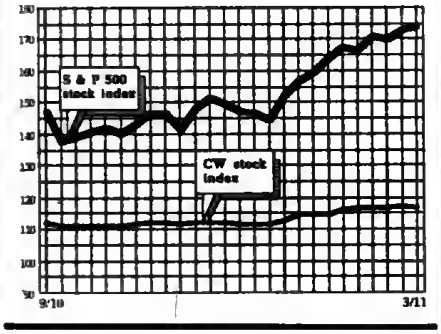

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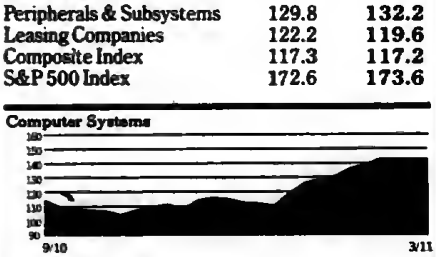
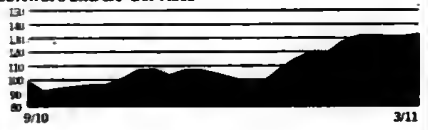
Software & DP Services	131.5	132.8
Semiconductors	110.0	108.2
Peripherals & Subsystems	129.8	132.2
Leasing Companies	122.2	119.6
Composite Index	117.3	117.2
S&P 500 Index	172.6	173.6

Computer Systems



Supplies and Accessories

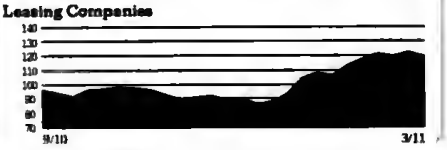
Software and DP Services



Semiconductors

Peripherals and Subsystems

Leasing Companies



Stock trading summary

CLOSING PRICES WEDNESDAY, MARCH 11, 1987

EXCH	52 WEEK RANGE (1)		PRICE CLOSE MARCH 11 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Computer Systems					
O	ALPHA MICROSYSTEMS	8	4	4.56	-0.3	-6.4
O	ALTOS COMPUTER SYS	19	10	15.75	-0.4	-2.3
A	AMDAHL CORP	41	14	40.25	+2.6	+7.0
O	APOLLO COMPUTER INC	23	9	19.25	-0.1	-0.6
O	APPLE COMPUTER INC	71	24	66.25	1.4	2.0
N	AT&T	28	22	24.00	+0.9	+3.8
O	C P T CORP	6	3	3.88	-0.4	-8.8
N	COMPAQ COMPUTER CORP	35	12	33.00	+1.8	+5.8
A	COMPUTER CONSOLES INC	12	7	8.63	0.8	8.0
O	CONCURRENT COMP CORP	23	11	15.75	+0.4	+2.4
N	CONTROL DATA CORP	31	20	27.00	-1.3	-4.4
O	CONVERGENT TECH	12	4	10.63	0.3	2.3
N	CRAY RESH INC	133	85	131.50	+11.3	+9.4
O	DAISY SYS CORP	15	8	11.25	-0.3	-2.2
N	DATA GEN CORP	45	25	36.00	1.5	4.1
N	DATAPOINT CORP	9	4	5.13	+0.0	+0.0
N	DIGITAL EQUIP CORP	173	76	168.25	+2.0	+1.2
N	FLOATING POINT SYS INC	46	11	14.50	-0.9	-5.7
N	GOULD INC	29	15	18.25	-0.9	-4.8
N	HARRIS CORP	40	27	36.50	1.4	3.6
N	HEWLETT PACKARD CO	60	36	54.38	-0.9	-1.6
N	HONEYWELL INC	84	58	70.00	+0.5	+0.7
N	IBM	162	118	141.75	+1.9	+1.3
O	IPL SYS INC	4	2	2.75	+0.3	+10.0
N	ITT CORP	66	43	84.00	1.0	1.5
N	M A COM INC	19	12	14.25	-0.4	-2.6
N	MATSUSHITA ELEC INDL LTD	136	71	119.50	+1.0	+0.8
O	MENTOR GRAPHICS CORP	29	11	28.25	+1.1	+4.1
N	NBI INC	14	8	10.13	-0.5	-4.7
N	NCR CORP	67	40	65.63	-0.1	-0.2
N	PRIME COMPUTER INC	26	16	20.50	1.3	6.7
O	STRATUS COMPUTER	37	17	34.75	+2.8	+8.8
O	SYMBOLICS INC	15	4	4.63	+0.7	+17.4
O	TANDEM COMPUTERS INC	73	22	69.50	+4.4	+6.7
N	TANDY CORP	56	31	51.50	1.9	3.5
N	TEXAS INSTRS INC	170	103	167.25	+0.5	+0.3
4	ULTIMATE CORP	35	13	24.25	+0.3	+1.0
N	UNISYS CORP	113	58	102.00	2.4	2.3
4	WANG LABS INC B	22	11	15.88	+0.4	+2.4
4	WANG LABS INC C	22	11	15.81	+0.1	+0.4
N	XEROX CORP	75	49	73.25	+0.3	+0.3
Supplies & Accessories						
N	AMER BUSINESS PRODS	37	23	29.50	-0.5	1.7
N	BARRY WRIGHT CORP	25	14	17.50	0.3	1.4
A	DUPLEX PRODS INC	23	18	21.75	-0.3	-1.1
N	ENNIS BUSINESS FORMS INC	34	22	32.00	+0.5	+1.8
N	3M CO	140	97	124.75	-2.1	-1.7
N	MOORE LTD	28	20	23.63	+0.1	+0.5
O	STANDARD REGISTER CO	53	32	49.00	0.8	1.5
N	WALLACE COMPUTER SVCS	50	37	44.88	2.4	5.0
Software & DP Services						
O	ADVANCED COMP TECH	7	3	4.50	+0.3	+5.9
N	ADVANCED SYS INC	21	12	21.25	+1.8	+8.3
O	AGS COMPUTERS INC	40	17	38.25	+0.5	+1.3
O	AMERICAN MGMT SYS INC	33	13	31.25	+2.5	+6.7
O	AMERICAN SOFTWARE INC	27	10	26.25	+1.3	+5.0
N	ANACOMP INC	8	3	7.13	+0.0	+0.0
O	ANALYSTS INTL CORP	11	4	10.38	+0.1	+1.2
O	ASHTON TATE	30	10	27.00	+0.8	+2.4
O	ASK COMPUTER SYS INC	17	9	15.63	0.4	2.3
O	ASTRADYNE COMP IND	3	1	1.78	+0.0	+0.0
N	AUTOMATIC DATA PROC	47	29	45.63	+2.4	+5.5
O	BOOLE & BABBAGE INC	11	4	10.00	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	44	17	39.38	-0.9	2.2
O	COMPUTER HORIZONS CORP	15	10	14.25	+0.8	+5.8
O	COMPUTER NETWORK TECH	10	4	4.50	+0.1	+1.4
N	COMPUTER SCIENCES CORP	54	30	51.88	0.8	1.2
N	COMPUTER TASK GROUP INC	19	11	15.63	-0.5	3.1
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	16	10	15.00	+0.8	+5.3
N	CULLINET SOFTWARE INC	16	8	10.63	+0.4	+3.7
O	CYCARE SYS INC	17	7	8.75	-0.4	-4.1
O	DUQUESNE SYS INC	26	9	25.75	+1.5	+6.2
N	GENERAL ELEC CO	108	71	107.00	+1.3	+1.2
N	GENERAL MTRS CORP	50	24	38.38	0.8	1.9
O	HOGAN SYS INC	16	7	15.50	+2.9	+22.8
O	INFORMATION SCIENCES INC	4	1	1.31	0.2	12.5
O	INFOTRON SYS CORP	18	7	8.75	+0.3	+2.9
O	INNE INC	16	5	8.75	+0.1	+1.4
N	LOGICON INC	38	22	25.50	-0.8	2.4
O	LOTUS DEV CORP	25	8	21.50	0.6	2.8
O	MANAGEMENT SCI AMER	21	11	19.63	+0.4	+1.9
O	MCI COMM CORP	13	5	8.38	+0.5	+6.5
O	MICOM SYS INC	16	10	15.00	+0.3	+1.7
O	MICRO PRO INTL CORP	6	2	4.75	0.2	3.8
N	MICROSOFT CORP	86	26	85.50	-5.8	+7.2
O	NATIONAL DATA CORP	27	18	25.13	+0.9	+3.8
O	ON LINE SOFTWARE INT	23	10	22.25	+1.0	+4.7
O	ORACLE SYS CORP	44	13	39.50	2.0	4.8
N	PANSOPHIC SYS INC	42	25	37.00	1.6	4.7
O	POLICY MGMT SYS CORP	30	15	27.00	1.0	3.6
O	PROGRAMMING 4 SYS INC	13	8	11.25	-0.5	4.3
O	REYNOLDS & REYNOLDS CO	42	27	36.50	+0.8	+2.1
O	SCIENTIFIC COMPUTERS INC	8	4	7.50	-0.3	3.2
O	SEI CORP	26	15	25.75	+1.0	+4.0
O	SHARED MED SYS CORP	53	30	38.38	+2.0	+5.8
O	SOFTWARE AG SYSTEMS INC	22	10	12.13	3.4	21.8
O	SOFTWARE PUBG CORP	18	5	15.13	+0.9	+6.1
A	STERLING SOFTWARE INC	21	10	13.38	-0.1	0.6
N	SUNGUARD DATA SYSTEMS	20	10	19.25	-0.5	2.5
N	UCCEL CORP	34	17	32.50	-0.5	1.5
N	UPS CORP	22	13	21.13	+0.3	+1.2
O	VM SOFTWARE INC	39	12	35.75	-0.3	-0.7
Semiconductors						
N	ADVANCED MICRO DEV	34	13	20.63	-0.6	2.9
N	ANALOG DEVICES INC	25	14	20.63	+0.0	+0.0
O	ANALOGIC CORP	14	10	11.88	+0.0	+0.0
N	APPLIED MAGNETICS CORP	29	13	26.25	1.8	6.3
O	AVANTEK INC	23	14	18.00	0.6	3.4
O	NAICO CORP	6	3	5.13	-0.1	2.4
O	INTEL CORP	39	16	35.75	-0.8	2.1
O	MICRO MASK INC	7	2	8.25	-0.3	+4.2
N	MOTOROLA INC	52	34	50.25	+1.8	+3.8
N	NATIONAL SEMICONDUCTOR	16	8	14.88	-0.8	5.8
N	TERADYNE INC	30	16	22.63	-0.8	3.2

EXCH	52 WEEK RANGE (1)		PRICE CLOSE MARCH 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Peripherals & Subsystems					
A	AM INTL INC	9	5	8.88	+0.3	+2.9
A	ANDERSON JACOBSON INC	4	1	3.00	+0.0	+0.0
O	AST RESH INC	23	11	20.75	1.0	-4.6
O	ATLOTROL CORP	10	5	7.50	+0.0	+0.0
O	AVANT GARDE COMPUTING	7	3	3.75	0.3	-6.3
O	BANCTEC INC	13	8	10.38	0.4	-3.5
N	BOLT BERANEK & NEWMAN	40	37	36.25	+1.5	+2.7
A	CETEC CORP	9	5	5.88	-0.3	4.1
A	COGNITRONICS CORP	8	2	3.38	+0.4	+12.5
N	COMPUGRAPHIC CORP	26	16	22.25	+0.3	+1.1
N	COMPUTERVISION CORP	23	10	20.00	0.9	-4.2
N	CONRAC CORP	20	12	19.63	+1.8	+9.0
A	DATAPRODUCTS CORP	18	11	13.50	0.5	3.6
A	DATARAM CORP	18	7	6.25	+0.8	+8.2
O	DATA SWITCH CORP	9	5	6.75	0.3	3.8
O	DATUM INC	7	4	5.88	-0.1	-2.1
N	DECISION INDS CORP	15	8	10.25	-0.8	5.7
O	ENDATA INC	9	5	8.88	+0.3	+2.9
O	EMC CORP	34	11	27.25	+0.0	+0.0
O	EVANS & SUTHERLAND	39	20	36.00	+0.5	+1.3
N	FLOATING POINT SYS INC	46	11	14.50	-0.9	5.7
O	GANDALF TECHNOLOGIES	6	5	6.38	0.1	1.5
N	GENERAL DATACOMM IND	15	8	12.13	0.8	5.8
N	HAZELTINE CORP	30	18	29.75	+0.0	+0.0
O	ICOT CORP	13	8	12.25	+0.9	+7.7
O	INFORMATION INTL INC	18	13	15.75	+1.3	+8.6
O	INTECOM INC	7	3	3.00	+0.0	+0.0
O	INTERLEAF INC	15	8	9.63	+0.1	+1.3
O	MEGADATA CORP	7	2	5.63	+0.4	+7.1
A	MSI DATA CORP	18	10	15.75	+1.8	+12.5
N	NASHUA CORP	30	20	28.88	0.3	0.9
O	NETWORK SYS CORP	19	10	16.38	0.8	3.7
N	NORTH AMERN PHILIPS CORP	48	35	40.75	1.3	3.0
N	NORTHERN TELECOM LTD	45	27	41.75	0.6	1.5
O	NOVELL INC	45	15	44.50	+2.3	+5.3
N	PARADYNE CORP	11	4	7.25	+0.5	+7.4
A	PENRIL CORP	8	4	4.25	0.3	-5.8
N	PLESSEY PLC	38	24	38.50	+0.5	+1.3
O	PRINTRONIX INC	15	10	10.75	0.8	-5.5
N	QMS INC	18	11	18.38	+8.3	+81.7
O	RAMTEK CORP	7	3	5.00	+0.0	+0.0
N	RECOGNITION EQUIP INC	27	10	22.63	+1.0	+4.8
O	SCAN TRON CORP	19	11	13.75	+2.3	+19.8
N	SCIENTIFIC ATLANTA INC	16	8	15.25	0.1	-0.8
O	SEAGATE TECHNOLOGY	42	9	38.50	0.1	-0.3
N	STORAGE TECHNOLOGY	6	2	4.25	0.5	-10.5
O	SUN MICROSYSTEM INC	33	11	31.38	+3.1	+11.1
A	T BAR INC	8	5	7.63	+0.0	+0.0
A	TAB PRODS CO	19	12	18.50	0.1	0.7
O	TANDON CORP	8	2	3.50	0.3	-6.7
A	TECINC	7	3	3.50	0.3	-6.7
N	TEKTRONIX INC	43	27	39.25	+0.1	+0.3
O	TELEVIDEO SYS INC	4	2	2.50	+0.1	+5.3
N	TELEX CORP	102	52	88.75	3.3	3.5
N	TIMEPLEX INC	41	14	38.38	+4.4	+12.5
N	TITAN CORP	12	8	7.75	+0.3	+3.3
O	VISUAL TECHNOLOGY INC	1	0	0.44	+0.0	+0.0
O	WYSE TECH	30	13	28.13	-0.1	-0.4
Leasing Companies						
N	COMDISCO INC	29	15	27.13	+0.1	+0.5
N	CONTINENTAL INFO SYS	14	7	13.13	+0.0	+0.0
O	FINALCO GROUP INC	5	2	2.88	+0.0	+0.0
O	PHOENIX AMERN INC	8	3	5.75	1.0	14.8
O	SELECTERM INC	12	5	5.63	-0.1	2.2
N	U S. LEASING	52	38	52.13	-1.9	-3.7

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IBM leads the pack

Big Blue's stock gets investors' nod; Compaq, Apple post drops

Despite its profit declines and product-line shortcomings, IBM continues to be a leader on Wall Street.

During a roller-coaster week for the Dow Jones industrial average, Big Blue jumped almost five points in the first four days of trading to close Thursday at 144¼. Although the analyst community is still widely mixed on IBM's earnings prospects this year, its status as a blue chip has continued to fuel a bullish performance since the stock plummeted to 115 earlier this year.

IBM's four-point surge in Tuesday's trading helped lead the Dow up almost 20 points. IBM was one of nine U.S. stocks reportedly recommended recently by Japan's Nomura Securities Co., the world's largest brokerage firm, which said it will invest $10.4 billion in U.S. and other non-Japanese securities.

Other computer stocks had a less successful week. Compaq Computer Corp. dropped 2⅝ to 30⅛ Thursday, possibly due to speculation about more proprietary architecture in IBM's next generation of microcomputers. Apple Computer, Inc.'s recent boom eased a bit, as the stock dropped two points in four days to 65¼.

CLINTON WILDER

DBMS

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it is a high-profile, leading-edge technology with which both want to be identified. Neither hesitates to undercut the other's distributed products.

"It's unbelievable how these two companies hammer each other in a huge market," says John McCarthy, research manager at Forrester Research, Inc., after a dinner recently with Relational Technology officials.

Many observers say they believe the rivalry will benefit the industry, pushing distributed data base technology forward at a faster pace than it would go if left to a single, dominant supplier.

'Helping, not hindering'

"It's helping the relational data base market rather than hindering it," says Michael R. Davidson, manager of systems development at Toronto's Nestle Enterprises Ltd., a user of Relational Technology's Ingres.

At the moment, the discussion is not about lofty technical gains so much as the urbane figure of Tierney, 42, a 16-year veteran of IBM, who for three years functioned as a spokesman

Oracle's Ellison

for Relational Technology.

Industry sources report that Relational Technology officials say one thing about the circumstances of Tierney's departure for the record and another in casual conversation, particularly after he resurfaced at archrival Oracle. For the record, Relational Chairman Gary Morgenthaler says Tierney "left of his own volition."

Tierney says he did not have the Oracle job lined up when he decided to leave Relational Technology. He says he found himself in a position where his first move was to explore venture-capital firms in the Silicon Valley, until Oracle Chairman Larry Ellison called him a month later.

"I never thought we would get the chance to hire Peter. I expected him to become president of Relational Technology,"

Oracle's Tierney

Ellison says. "We felt he was really the leader in that company."

Tierney pushed out?

Tierney was viewed differently within Relational Technology. Morgenthaler says his company has "some growing to do in marketing" and that it was looking for "new and more effective leadership" when it promoted Seashols to vice-president of sales and marketing and directed Tierney to report to him.

"I like Pete. We're friends. But I frankly wish he had somewhere else to go. One can wish . . . enough said," Morgenthaler says.

Ellison, for his part, is taking the high road. Relational Technology is just one of several companies that Oracle competes with, and some of that competition is more upscale, he implies. "We just do not see Relational Technology in the marketplace as often as IBM or Digital Equipment Corp.," he says.

When talking to a *Fortune* magazine reporter last fall, however, Oracle officials were more specific in how they viewed Relational Technology. Oracle was growing by leaps and bounds, while Relational Technology was "fading fast," they were cited as saying in the Sept. 29, 1986 issue.

"They told me they no longer considered Relational Technology a factor," the *Fortune* reporter says.

While Oracle's revenue growth has spurted ahead of Relational Technology's during the last two years, the two companies still compete intensely in the DEC VAX market, where both derive a large share of their bread-and-butter business.

Oracle, for example, earned $31 million of its $55 million 1986 revenue from DEC customers, while Relational Technology earned $22 million of its $28.1 million from the same source, according to Technology Financial Services, Inc., a market research firm in Chelmsford, Mass. Oracle may not see Relational Technology salesmen very often, but DEC spokesmen say they see them frequently. DEC, with its RDB relational system, competes directly with Oracle and Relational Technology.

Figures from Computer Intelligence, the La Jolla, Calif., market research firm, show Relational Technology's share of this market dropped from 43% to 36% last year, Oracle's share dropped from 25% to 22%, while DEC's RDB rose from 21% to 28%.

Oracle stretches lead

Two years ago, the revenues of Oracle and Relational Technology, $23 million and $17 million, respectively, were much closer than the $55 million vs. $28 million with which they closed 1986. The gap is expected to widen as the firms close fiscal 1987, with Wall Street analysts expecting the publicly held Oracle to top $120 million. Relational Technology officials say they expect to reach $45 million to $50 million this year and $100 million in 1988. Ellison at Oracle, which is currently growing at a rate of 140%, is reluctant to predict that this expansion will continue indefinitely but says he sees his company topping $200 million in 1988.

In the personal computer market, Oracle has gained a wide lead, with 16,000 installed systems, having brought out a product two years ago. Relational Technology issued the PC version of Ingres a month ago, saying 1,000 customers were already using it. The revenue difference is not significant since the PC products sell in the range of $1,000, but Oracle's early entry made its higher priced minicomputer and mainframe systems more attractive.

Both Oracle and Relational Technology offer mainframe products as well, but neither firm is believed to have sold heavily in that arena. Oracle declines to break out figures for mainframes from its installed base of 6,000 systems. Relational Technology spokesmen say they have 6,300 systems installed, including 100 mainframe systems.

'Frustrating' revenue gap

Oracle's Tierney claims it was the widening revenue gap that led to the reorganization at Relational Technology. "The frustration associated with that is incredible," he adds.

Despite a larger number of employees, 1,000 vs. Relational Technology's 400, Oracle is also believed to be more profitable

Gary Morgenthaler

than its across-the-bay competitor. Tierney said Oracle clears 20% profit on its revenue. Relational Technology spokesmen say their company clears 7% to 10%.

Morgenthaler says the revenue gap can be explained by the fact that Relational Technology was formed three years after Oracle; Relational Technology's skill, particularly its distributed data base approach, will enable it to catch up. So far, Relational Technology has garnered more prominent distributed data base clients, including Carnegie-Mellon University in Pittsburgh, where Ingres beat out Oracle.

One of the technical differences between the two companies was Oracle's early commitment to IBM's Structured Query Language as its data access language. The choice proved the company prescient when SQL won wide acceptance in the marketplace in 1986.

Relational Technology's Ingres uses a proprietary data access language, Quel, which is secondarily interfaced with SQL. In Quel, the SQL SELECT command becomes RETRIEVE, and the SQL INSERT command be-

Relational's Seashols

comes APPEND. Though the differences may seem semantic, Tierney claims the Quel-to-SQL interface has its shortcomings.

A SORT command in SQL, for example, eliminates all duplicates; Quel does not. "If you say SORT in SQL, you get a list with no duplicates. If the command is translated into Quel, you get something different back," he claims.

Interface seen as liability

The SQL-to-Quel interface "is a drawback for them," says Damion Rinaldi, who followed the Oracle-Relational Technology rivalry in 1986 as a software analyst at International Data Corp., a Framingham, Mass., market research firm.

Other industry sources point out that Oracle appears to be more quickly portable to different environments than Ingres and that the program runs under both IBM's MVS and VM operating systems.

Relational Technology concentrated on the Unix market, in which more than half the company's minicomputer systems are sold, and now finds its margins being nibbled away by new competitors, like Informix Software, Inc.

Counterpunches

Tierney devised effective strategies where he could to counter Oracle, Ellison says. For issues like Relational Technology's Quel data access language, "there was nothing he could do unless he became a C programmer," Ellison adds.

Stewart A. Schuster, vice-president of marketing at Sybase, Inc. in Berkeley, Calif., and former employee of both Oracle and Relational Technology, says, "The problems at Relational Technology go much deeper than what any one person can do. Oracle made some smart early calls, like portability to PCs and mainframes and using SQL."

The two companies' marketing strategies are identical, Schuster says, which favors the larger company in the long run.

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Language tool added to Framework

Ashton-Tate pushes integrated package as development system

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — In a move aimed at boosting Framework as a development system, Ashton-Tate last week announced the Framework II Developer's Toolkit.

Unlike most integrated microcomputer software packages, Framework includes a programming language, which is called Fred. The tool kit is designed to assist both corporate and independent software developers in making better use of this programming language.

The tool kit consists largely of chunks of Fred code suited for specific purposes.

"It is a series of frames, really nothing more than Fred code, each with a specific name, and documentation as to what it will do and how to use it," a beta tester and systems developer with a large corporation said.

The tool kit has already helped this beta tester.

"We were developing an automated proposal generator using Framework, in which the user was prompted for inputs. It was a lot of Fred code to write, with a lot of redundancy of code. The tool kit lets a developer not have to reinvent the routines for different modules," the user said.

Included in the tool kit are routines to check the files on a floppy disk and verify that the proper disk is being used, as well as additional functions that turn off menus, clock, desktop frames and status panels and a code that changes desktop characters.

"It can make Framework not even look like Framework," the user said.

Developers need only one copy of the tool kit to service any number of Framework users, the vendor said.

Ashton-Tate expects that 15% to 20% of Framework users will pick up the developer's tools, said Wendy Ruess, Framework product manager.

"We had users that expressed a lot of interest in being able to use customized applications built around Framework," Ruess said.

The product will be available directly from Ashton-Tate. It will sell for $100 until May 30 and $150 after that.

Tandem

FROM PAGE 1

mance levels that surpass even the fastest hierarchical DBMSs, including IMS Fast Path.

During a recent benchmark test that simulated the processing of banking debits and credits, a configuration that included Nonstop SQL and 32 Tandem CPUs executed an average of 220 transactions/sec., Codd noted.

The throughput, which could have gone even higher if the system had contained additional computers, beats the estimated 200 transactions/sec. that IMS Fast Path would probably have delivered under the same conditions, he added.

Codd, who originated the relational model and has seen Tandem's SQL interface in advance, describes the product as a "very dramatic announcement" because it addresses his creation's Achilles heel — its reputed lack of performance.

Relational systems are known primarily for the ability to allow users to query their data bases without having to engage in a lot of procedural coding.

But the very traits that make relational DBMSs easier to use than their hierarchical counterparts have also made them comparatively slow and have contributed to the widespread perception that they are intrinsically unsuitable for production environments. To be optimized for ad hoc queries by casual users, relational data bases have traditionally had to consume large amounts of processor resources, according to Omri Serlin, head of Los Altos, Calif.-based Itom International, Inc.

Encompass, by contrast, has been largely immune from such performance limitations by virtue of its conformance to Tandem's proprietary Nonstop architecture, which was expressly designed for on-line transaction processing.

Unlike IBM mainframes, the largest of which is only a six-way processor complex, Tandem's architecture supports configurations that include dozens, even hundreds, of CPUs. As a Nonstop user's application work load grows, it can enlarge its computing capacity simply by installing additional processors.

Whether the vendor's adoption of the language necessitated any major changes in its DBMS's internal workings has yet to be disclosed. "I suspect they would have had to change the system's insides quite substantially because the addition of a high-level language requires a lot of program development beyond the mere installation of a new compiler," Codd said. But the cofounder of the San Jose, Calif.-based Codd & Date Consulting Group, Inc. could cite no evidence to support his suspicion.

> TANDEM'S interface SQL provides "a higher degree of fault tolerance than any other system I know of in the data base world."
>
> E. F. CODD
> FORMER IBM FELLOW

Tandem, which plans to announce Nonstop SQL today, declined to discuss the product beforehand.

Although the company's SQL implementation apparently adds little to Encompass's performance, the enhancement does benefit the DBMS by supporting nonprocedural data base accesses.

By itself, Encompass's support of SQL is by no means remarkable. Many other DBMS suppliers have also implemented the language to minimize their need for procedural programming.

What puts Nonstop SQL in a class by itself, Codd asserted, is that it couples nonprocedural operation with high transaction processing volumes. No supposedly relational system approaches the Tandem product's performance, and no hierarchical offering rivals its ease of use.

Because of the Nonstop architecture's inherent redundancy, Tandem's SQL interface also provides "a higher degree of fault tolerance than any other system I know of in the data base world," Codd said.

With Nonstop SQL, Tandem has implemented virtually the same version of the high-level language as IBM supports on its DB2.

From a marketing perspective, the company's move probably makes sense. One of SQL's major attractions is that it "allows companies such as Tandem to create an environment that will prove comfortable to people who are already familiar with IBM systems," Serlin said.

But from a purely technological standpoint, the firm's choice of SQL versions may be regrettable. "SQL still suffers from many problems," Codd said. "Unfortunately, Tandem has done very little thus far to correct them. I've urged the company to try to develop its own brand of the language."

Prices and availability dates for Nonstop SQL were unavailable as of press time but are expected to be released today.

INSIDE LINES

Fine orchestration. After a lively and well-received demo of Hal, Lotus's mid-life kicker for the 1-2-3 spreadsheet, Hal author Bill Gross last week told the Capital PC User Group that a Hal companion product is in the works for Lotus's Symphony, as well.

Strange bedfellows. Industry heavyweights, including IBM, AT&T and DEC, are starting up a research center for boosting programmer productivity and software quality, according to a filing made to the Justice Department. The filing, required to obtain antitrust exemptions, says the Industry/University Cooperative Research Center for Software Engineering will be co-located at the University of Florida and Purdue University. Other participants are Computer Sciences Corp., GTE Data Services, Harris, Hewlett-Packard, Magnavox, Racal-Milgo and Modular Systems.

So you want to be in pictures? Computer Memories, Inc., the Chatworth, Calif.-based provider of the crash-prone hard disks used in many IBM PC ATs, last week announced a letter of intent to acquire the assets and corporate identity of Hemdale Film Corp., which released the highly successful film "Platoon." Computer Memories, which ceased production of its disk drive in June 1986 but holds on to nearly $30 million in cash, will acquire Hemdale through the issuance of new shares of its stock. The new firm will use the Hemdale name.

Now you see it, now it's gone. Softsave Information Services, Inc., the Vancouver, B.C., software rental firm sued by several leading micro software firms in December, has gone out of business. Softsave was allegedly copying, renting and distributing pirated copies of software from firms including Ashton-Tate, Lotus and Lifetree Software, Inc. Softsave's owners recently filed for Canadian bankruptcy protection, claiming a combined $230,000 (in Canadian dollars) in debts.

Rolm, phone home. IBM has done some restructuring at its Rolm Corp. subsidiary in Santa Clara, Calif., in order to bring Rolm closer to home. IBM has combined Rolm's domestic sales, installation and service employees with IBM's information systems group into a new sector, the telecommunications marketing and service organization. That sector will report to Rolm Vice-President Jack Blumenstein; Blumenstein in turn now reports to Edward Lucente, IBM's vice-president for information systems.

They hear the call. The hot market for departmental processors is drawing another entrant in Control Data Corp., which next week is scheduled to announce its first non-computer-room system, the Cyber 930. Aimed at the scientific and engineering markets, the 930 has 8M bytes of memory and replaces the Cyber 810 at the low end of the Cyber product line, where it apparently will be pitted against systems such as the lower half of the DEC VAX family and the IBM 9370. Enhancements to the NOS/VE operating system are said to include shells that allow users familiar with DEC's VMS operating system, the Apple Macintosh and the IBM Personal Computer to utilize comparable commands and features on the 930.

Enter another dimension. IBM seems to be endorsing the Graphical Kernel System (GKS) graphics standard (ANSI X3.124) through a contract with Uniras, Inc., a graphics software company. Uniras, under a contract with IBM's UK operations, has developed an interface to the GKS standard for users of IBM's GDDM mainframe graphics system. "IBM usually, in everything that it does, has proprietary standards," says IDC analyst Victoria Brown. "This means they are accommodating users a bit in the area of two-dimensional graphics."

We now do windows, too. Quarterdeck has built enhanced graphics adapter support into an updated version of its Desqview multitasking windowing environment, which is expected in April. With this addition, Desqview now supports Microsoft Windows, Digital Research's Graphics Environment Manager interface as well as the Topview application interface. The price will be $129.95.

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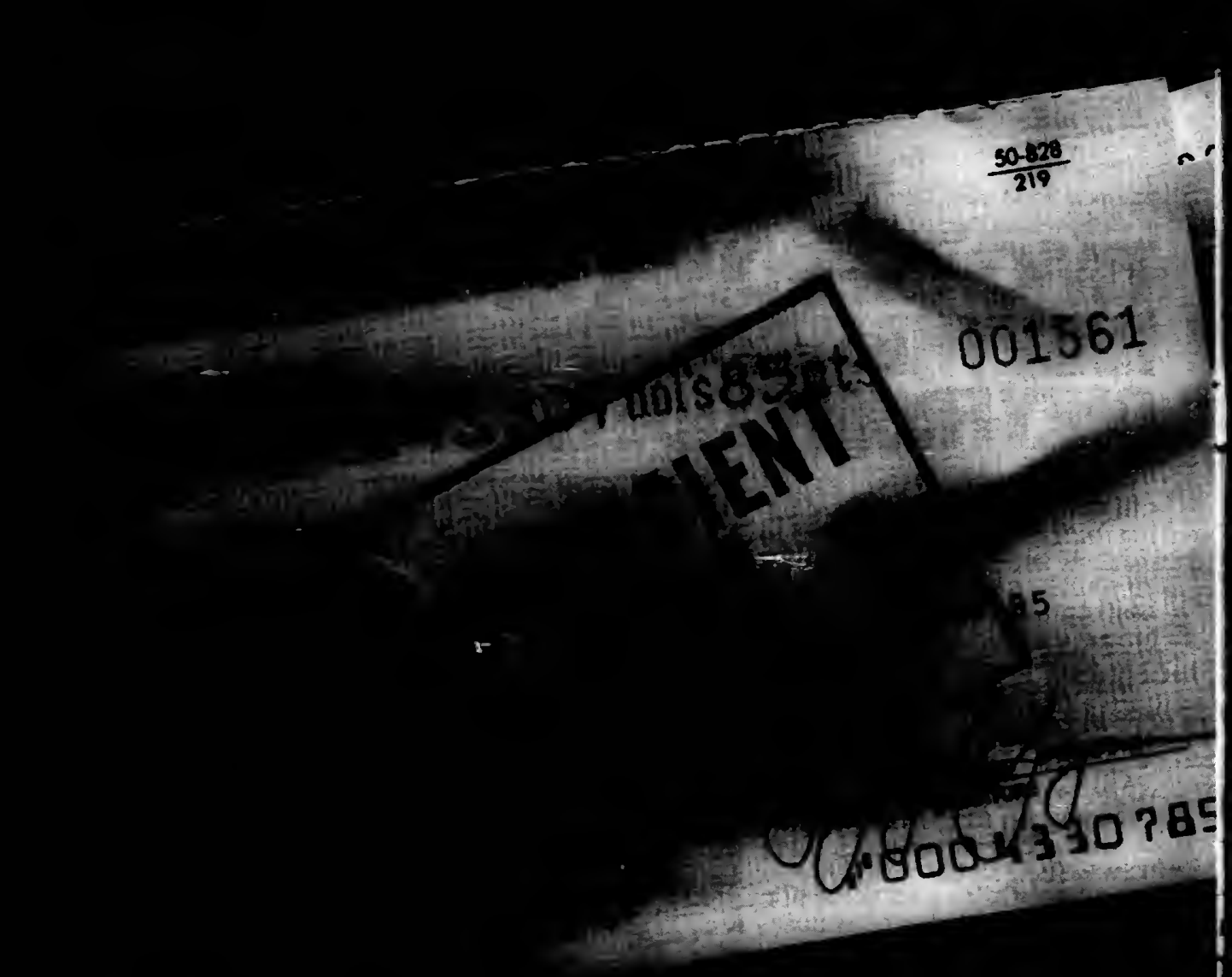

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